

MEDICAL AND SURGICAL REPORTER.

No. 2127.

SATURDAY, DECEMBER 11, 1897.

VOL. LXXVII—No. 24.

ORIGINAL ARTICLES.

THE INFLUENCE OF DIGITALIS ON THE HEART-MUSCLE WHEN ADMINISTERED FOR A LONG PERIOD OF TIME, WITH A MICROSCOPIC STUDY AND REPORT.*

H. A. HARE, M.D.† AND W. M. L. COPLIN, M.D.‡ PHILADELPHIA.

This paper is based upon a series of experiments designed to determine whether digitalis when administered for a considerable period of time actually increases the development of the heart-muscle. There is probably no drug that has been studied more thoroughly at the bedside and in the laboratory than digitalis. Ever since its employment by Witherington and his classic reports upon its clinical uses clinicians have relied upon it as one of their most valued medicaments. Particularly is this true with relation to diseases of the heart in its valvular forms when compensatory hypertrophy has not taken place by natural processes. Laboratory investigators also have studied the drug exhaustively by every means and form of apparatus, so that we know something of its physiologic effects as produced by the administration of single and multiple, or large and small doses, when they are given within a period covering a few hours.

While we know certain facts about the acute effects of digitalis, if I may use such a term, we know little or nothing of what

might be called its chronic influence over the heart-muscle itself. It is true that a multitude of clinical observers have found the prolonged use of this drug in proper doses to produce an increase in the force of the apex-beat of the heart, an increase in arterial pressure, and a slowing of the pulse-beat, but though these effects are explained by the known physiologic influence of the drug the question as to whether the continuous use of digitalis really strengthens the heart has been undecided. By the term *strengthen* I do not refer to a temporary increase of power produced by stimulation such as follows the use of alcohol or ammonia, but a condition in which by reason of increased muscular development the heart is actually increased more or less permanently in its muscular development and ability to do any extra work that may be thrown upon it.

With the experiments made to determine whether digitalis increases the size and force of the pulse-wave by influencing systole or diastole I shall not deal, nor will I speak at this time of the effects of the drug upon the nervous supply of the heart and the trophic influences that govern its nutrition, although it is probable that through these influences the ef-

* Read before the Philadelphia County Medical Society, December 8, 1897.

† Professor of Therapeutics in Jefferson Medical College.

‡ Professor of Pathology in Jefferson Medical College.

fects obtained by its use are in part brought about.

When digitalis is given to a patient with cardiac disease and death takes place, the post-mortem examination usually reveals an increase in the development of the heart-muscle, and it has been customary to attribute this solely to the effort made by the system to establish compensation by hypertrophy. The experiments about to be detailed would seem to prove that the increase in muscular development may be in part due to the drug, and explains why it is that digitalis is so much more effective in most cases of valvular disease with failing compensation than any other heart-stimulant or heart-tonic, for all the others seem to have, and probably do have, but a temporary stimulating effect.

In a brief paper entitled "The Choice of the Various Preparations of Digitalis," published in the *Therapeutic Gazette* for August, 1897, I pointed out the fact that digitalin, digitoxin, and digitalein are the principles of digitalis soluble in alcohol, and that they are also the principles that chiefly stimulate the heart-muscle, the digitalin also stimulating the vagus nerves. On the other hand digitonin depresses the vagus nerves and is insoluble in alcohol. By reason of this fact it is manifest that when we desire to aid the heart in cases of valvular disease we should use an alcoholic preparation of digitalis in preference to any other pharmaceutical product or even the powdered drug itself, and this may be accomplished by employing the tincture, or better still, a tested fluid extract that is of known and definite strength.

The experiments were carried out as follows: Search was made for a litter of ten pigs in which each pig would be, at the time of starting the experiment, about the same in weight and degree of development and in good health. Such a litter having been found of the age of two months, each pig was weighed and the lot divided into two batches of five each one of which was to serve for control-experiments, while the other batch was to receive ascending doses of digitalis. Care was taken in making the division that for each pig placed in batch No. 1 another of, as nearly as possible, the same size was placed in batch No. 2, so that there might be no difference in size between the con-

trol-pigs and those that were to receive the drug. As far as possible an equal division was made also as to sex. The pigs in each batch were then marked by lead tags inserted in their ears, so that in the event of their escaping from one pen to the other no confusion would arise. The two sets were then placed in two pens side by side and provided with separate feeding-troughs so constructed as to prevent spilling of the contents as much as possible. Precisely the same manner of feeding was employed for both sets, the food being first prepared in one receptacle and afterward divided into two equal parts, to one of which, that designed for the second batch, were added ascending amounts of normal liquid digitalis prepared by a thoroughly reliable firm, a fluid extract that is as nearly as possible a standard preparation containing the active ingredients of the drug, as each package of the crude drug is first tested by physiologic methods before it is prepared for the market. This physiologic test is the only one that can be satisfactorily employed to determine the probable therapeutic activity of a given sample of the drug over and above those commonly resorted to by pharmacists and chemists who estimate the probable value of a given fluid extract or tincture by ascertaining the amount of extractive, which indicates that the crude drug has been properly exhausted. It is not possible at present to make a chemic assay of digitalis.

Before the experiment began the pigs were weighed and were described as follows (January 2, 1897):

CONTROL-PIGS.

	Weight.
No. 1 (boar)	35 lbs.
No. 2 (boar)	36½ lbs.
No. 3 (sow)	39 lbs.
No. 4 (sow)	39 lbs.
No. 5 (boar)	40½ lbs.
Total weight	185 lbs.

DIGITALIS-PIGS.

	Weight.
No. 1 (boar)	37½ lbs.
No. 2 (boar)	35¾ lbs.
No. 3 (sow)	38 lbs.
No. 4 (boar)	31 lbs.
No. 5 (boar)	43 lbs.
Total weight	185¼ lbs.

The first dose of digitalis was given on January 14, 1897, owing to delay on the part of the apothecary who had sent for the particular preparation demanded. The dose was ten minims of the "normal liquid" named, given to the five digitalis-pigs night and morning, or approximately two minims to each pig twice a day. The dose of the same preparation for man is from one to three minims a day. On February 14, one month later, the dose was doubled, and on March 14, two months later, trebled (thirty minims). On April 3 it was raised to forty minims, and on April 17 to fifty minims. In other words, each pig received about ten minims twice a day after this time. As the weight of the pig was much less than that of a man, this dose was equal to about between 60 and 100 minims of the fluid extract a day per pig. This is a very large dose, but produced no ill effects owing to the gradual increase of the dose and probably to partial immunity.

As early as the middle of March the farmer in whose care the animals were placed reported that the pigs that were "getting the medicine" were "livelier and bigger than the ones that are not getting it."

On May 2, 1897, about four and a half months after the beginning of the experiment, the pigs were weighed on the same scales and killed by a butcher by an incision across the aorta (hemorrhage) and the hearts carefully removed. The hearts were removed by me and carefully weighed after the cavities had been cleaned of blood-clots by the use of clean water poured through them. The results were as follows:

CONTROL-PIGS.		Weight	
	Weight.	of heart.	
No. 1.....	78 lbs.	5	oz.
No. 2.....	78 lbs.	5	oz.
No. 3.....	87½ lbs.	5½	oz.
No. 4.....	55 lbs.	4	oz.
No. 5.....	99 lbs.	6¼	oz.
Total weight	397½ lbs.	25¾	oz.

DIGITALIS-PIGS.		Weight	
	Weight.	of heart.	
No. 1.....	82¼ lbs.	5	oz.
No. 2.....	83 lbs.	5¾	oz.
No. 3.....	86 lbs.	6	oz.
No. 4.....	70½ lbs.	5½	oz.
No. 5.....	95½ lbs.	6¼	oz.
Total weight	417 lbs.	28¾	oz.

It will be seen from this record that the total weight of the control-pigs is less by about twenty pounds than that of the digitalis-pigs, and that the hearts of the control-pigs weighed less by 3¼ ounces than the hearts of the digitalis-pigs. It is true that in No. 1 and No. 5 of the digitalis-series the hearts weighed the same as those of the control-pigs, but on the other hand it is a fact that control-pig No. 5 weighed more than digitalis-pig No. 5.

While these results, so far as the weight of the animals and of the hearts is concerned, are not sufficiently in favor of the digitalis-pigs to prove simple cardiac hypertrophy under its use, it is interesting to note that the increased activity of the circulation in the digitalis-pigs resulted in an increase in general activity during life and greater weight by twenty pounds.

The hearts were now placed in separate jars containing formalin solution and shipped to the Pathological Laboratory of Jefferson Medical College, to Dr. W. M. L. Coplin, Professor of Pathology, whose microscopic report is appended, and to whom I am under great obligations for the careful study that he has made.

REPORT.

Specimen of pigs' hearts sent to the Laboratory by Professor H. A. Hare.

Ten pigs' hearts preserved in formalin, strength of solution not stated.

Five specimens were in jars marked with Arabic numerals, and five in jars labeled with Roman numerals; those in Arabic, in addition to the number, had upon each label the word "Digitalis," while those marked in Roman numerals had nothing on the labels but the number.

On macroscopic examination the ventricular wall was very much thicker in the digitalis-hearts than in the others; it also cut with more resistance, and seemed uniformly firmer. The increase in the thickness of the left ventricular wall was very much more marked than that of the right.

The fixation was not perfect, and the deeper layers of the muscles had not been penetrated by the formalin. In order to make a microscopic study of the specimens, pieces were taken from near the apex of each ventricle, and all of the specimens were treated exactly alike.

The blocks of tissue removed were

placed in separate containers and each container numbered, the corresponding number being placed in a note-book, with the number of the heart and the number of the specimen, so that during the subsequent examination it was not known whether the observer was working with tissue from one or the other heart.

Each piece of tissue was dehydrated in alcohol, cleared in cedar-oil, infiltrated with paraffin, sectioned, and cemented to the slide, cleared up, stained with hematoxylin and eosin, dehydrated, cleared in creosote, and mounted in balsam.

Measurements were made by means of the filar micrometer, the rulings having been previously standardized with a stage-micrometer for 2-3 and $\frac{1}{4}$ objectives, and a tube-length of 160 millimeters.

The tissue was mounted in two pieces so as to secure transverse and longitudinal sections; three sections were mounted from each block, and three measurements made from each section, the mean being taken for the record; altogether, 270 measurements were made from each series, with the following results:

Of the hearts from the pigs that had not had digitalis the following results were obtained: No. 1, .1166 millimeter; No. 2, .1125 millimeter; No. 3, .0916 millimeter; No. 4, .0833 millimeter; No. 5, .0791 millimeter.

Digitalis-hearts gave as an average of all the measurements: No. 1, .1125 millimeter; No. 2, .1166 millimeter; No. 3, .1208 millimeter; No. 4, .1166 millimeter; No. 5, .1208 millimeter.

It is well known that the size of the cardiac muscular fiber varies widely; the measurements given ranging from .05 millimeter to .25 millimeter. The size of the muscular fiber is alleged to depend upon the activity of the muscle, the condition of its nutrition, and the condition of the muscle at the time of measurement—that is, whether the fiber measured is relaxed or contracted. It is presumed that under nearly all conditions the measurement is made in the condition of contraction, and particularly is this true of a heart in which the cavities are so readily emptied by bleeding, as occurs in consequence of the ordinary method of killing lower animals. Taking into consideration the age of the animal, its general nutrition, the method of killing, and

the subsequent contraction of the heart, it is to be inferred that the measurements given were made under conditions favorable to obtaining the highest measurement.

The highest measurement of the normal heart (.1166 millimeter) is higher than the lowest measurement of a digitalis-heart (.1125 millimeter), but the lowest measurement of the normal heart (.0791 millimeter) is far below the measurement of the heart from the pig which had had digitalis (.1125 millimeter).

Taking the sum of the measurements of the five hearts from animals having had digitalis, and deducting from that the sum of the measurements of the five hearts from animals that had not had digitalis, we find that the difference is .1042, which divided by five, in order to reduce it to the unit of one muscle-fiber, gives us a result of .0208 millimeter, which represents the mean increase in size of the cardiac muscle-fiber in the animals that had digitalis.

While this difference, amounting practically to .02 millimeter, strikes us at first as being very small, when we come to remember that it is between one-tenth and one-fifth the diameter of the muscular fiber under ordinary conditions, it practically accounts for the increase in the size of the heart without the necessity of referring that increase to the growth of new muscular fibers.

Thus, if it can be demonstrated—and the foregoing calculations seem to do as much—that there is an increase in the diameter of the muscular fibers amounting to one-tenth, and if under the administration of digitalis the weight of the heart is increased one-tenth, it would then seem probable that the entire increase would be due to an increase in the size of the muscular fibers, rather than to an increase in the number. If, however, heart No. 1 (digitalis) weighs more than the normal, the increase could only be explained by assuming an increase in the number of the muscle-fibers.

In conclusion I wish to thank Dr. W. P. Read, assistant in pathology, for valuable aid in conducting this rather tedious and prolonged investigation. Dr. Read infiltrated, sectioned, stained, and mounted the tissue; and working together we duplicated all measurements in order to, as

fully as possible, control our results. We have separately conducted the calculations for a mean result in each set of measurements in both series, in order to avoid mathematical error, and to further avoid this danger all vulgar fractions were calculated with a denominator of five figures, and decimal fractions to four figures; the results obtained by both systems were acceptable only when they coincided.

The fact that on macroscopic examination the ventricular wall is much thicker in the digitalis-hearts than in the hearts of those animals that received no digitalis, as noted by Professor Coplin, was remarked upon by me when the pigs were killed. This point seems to be of great importance, and its interest is increased by the additional statement that the muscle cut with more resistance and seemed uniformly firmer. Another point of very great interest is that the increase of the left ventricular wall was far greater than that of the right.

In this connection it is of interest to

consider for a moment the theory that the pneumogastric nerves, for which digitalis has an especial affinity, are the trophic nerves of the heart, and if this be so it is not hard to understand why digitalis increases the size of the heart-muscle. Whether this trophic influence be exercised or not it is well known that the effects of this drug upon the heart are such that its muscle-fiber obtains a greater supply of blood with each cycle by reason of the increased force of the systole, the heightened arterial pressure, and the prolonged and increased diastole.*

This research would therefore seem to prove that the prolonged use of digitalis is capable of producing cardiac hypertrophy in the normal heart, and if this is the case it is fair to assume that when the drug is given to a man suffering from valvular disease with deficient compensation it must aid materially in inducing compensatory hypertrophy, in addition to any immediate stimulant action that it may exercise upon the circulatory apparatus.

MEDICAL INSTRUMENTS OF PRECISION AND THE RESULTS OF SOME ORIGINAL WORK.*

HENRY EMERSON WETHERILL, M.D., PHILADELPHIA.

CLINICAL THERMOMETER.

It was Spencer, I believe, who said that we really only know things when we can measure them. I think it is better the more accurately we measure.

The clinical thermometer that I take pleasure in showing, records to 0.01° F., and has a magnifying index. The tube has been selected as one having no correction after having been seasoned for several years. A watchmaker's loupe may be used to aid the reading of the vernier. The thermometer is not made just as directed, but does the work intended. The reason for making this delicate one-minute thermometer was to determine slight differences of temperature in physiologic medicine, and in certain clinical cases. When

I first began to measure the moisture of the skin as expressed in terms of relative humidity, I had this thermometer made in order to tell slight differences in temperature, using it at that time as a Mason's hygrometer and with the use of Glashier's factors.

There are some objections to the more accurate way of determining relative humidity in clinical medicine, and not the least is the mathematics required in reducing the complicated empiric formulae, as, for instance, Apjohn's. The calculations may be hastened in their computation by such tables as that of the Weather Bureau, No. 127, issued by the United States Agricultural Department.

To make the method of determination of the amount of perspiration of the hu-

* Description read and instruments exhibited before the Philadelphia County Medical Society, December 8, 1897.

* See article on "Digitalis" in Hare's *Text-Book of Practical Therapeutics*.

man body easy, I began about four years ago to use the hygroscope, especially modified and conveniently arranged for clinical work. The instrument should be standardized by Daniell's, Mason's, Regnault's, or other hygrometer.

In practice a single thermometer corrected and used both as wet and dry bulb thermometer has given good results for the curve of correction of the instrument.

Exactly simultaneous readings cannot, however, be obtained in this way, and but one thermometer has to be corrected, and there is no difference between the scales of two thermometers.

I will show a thermometer used and made with magnifying index, Fahrenheit and Centigrade readings, and covering a wide range. It is standardized.

THE HYGROSCOPE.

The hygroscope is placed in the hands for five minutes, protected by a glass cover. The readings are to one per cent. relative humidity.

Other parts of the body may be observed, and the localization of sweating can be determined and expressed in numbers.

A uniform method of procedure is required, but it is interesting to note that relative humidities can be expressed as determined by a wet and dry bulb surface thermometer; by wet and dry bulb thermometer records in closed hands; by thermometers near the surface of the skin, and by using the same method of procedure in the mouth.

The hygroscope may be used uncovered, but to exclude atmospheric conditions and to get the best average method, I have used the glass-covered hygroscope.

A series of many tests on sick and well shows a tendency for the reading to be about 3 per cent. higher in the morning, and curves of change can be plotted, as I here show on charts.

Calculating the change of relative humidity for the diurnal changes of temperature does not wholly account for the diurnal change of relative humidity.

So it is not alone the temperature of the body that causes the change of moisture in the hands as observed throughout the day. The average varies with people, but fifty per cent. is a fair mean of results so far obtained.

CORRECTIONS OF THE INSTRUMENT.

Correction for the curve of calibration is made with Daniell's hygrometer. Parallax causes hardly any error. The error of markings is small. There is no change in metal spiral in consequence of temperature changes of the body. There are also no changes of the hygroscopic material for temperature alone irrespective of the temperature effect on the relative humidity. The eccentricity of the indicator is adjustable. A small screw at the back of the instrument adjusts the pointer. There are some other corrections, but they are not important.

The effect of the surroundings in general upon the reading is something that will require extensive work, and now I am plotting curves showing effects of the humidity of the air; of the temperature of the air; of barometric pressure; of the thermometer in the hands; the thermometer in the mouth; the temperature, the pulse, the respiration, and many other things which may show their relation in the matter.

In cases of pulmonary tuberculosis there have been some interesting results, and in cases of nephritis also. It is my wish to further continue my studies on different animal species, for as I am told by Dr. Sharp, different species will probably show different results.

Perhaps the instrument may be of some use in recording in a numerical manner a matter that has heretofore been expressed in a more uncertain way, except when great pains has been taken to weigh the amounts of perspiration; and it is my impression that the relative humidity of the skin, as expressed by the hygroscope, may show a close relation to the amount of fluid lost by the body per day in pounds.

MICROTOME.

I thought it might be interesting to exhibit a pocket microtome that has done good service in cutting sections in botany and in medical work as well. It is constructed on the inclined-plane principle, and enables one to cut sections to 1-800 of an inch in thickness.

ROTAMETER.

This is used to measure the length of ataxiographs. To express areas of dulness the rotameter is very accurate.

With some certainty one can express the weight of the heart in grams by multiplying the length of the periphery of superficial cardiac dulness expressed in centimeters by the constant 5.6. There are many causes making the results inaccurate, but by using a planimeter working on glass which has the projected area of dulness marked upon it, one gets a more accurate result. The instrument may be used for

measuring all surface distances.

A SMALL STOVE FOR THE SICK-ROOM.

The stove shown will boil a half-pint of ice-water in four minutes, and when not in use it folds compactly.

With the pyramid candle one can keep milk warm for 12 hours. The lamp is made of spun aluminum.

CURRENT LITERATURE CONDENSED.

Visceral Changes in Extensive Superficial Burns.¹

Many hypotheses have been brought forward to account for the constitutional symptoms following extensive superficial burns. Thus almost every writer on the subject advances a theory of his own as to their general pathology. Recently C. R. Bardeen reviews these various theories and finds it possible to group them somewhat like this: 1. Theories concluding that deaths from burns are due to loss of normal cutaneous activity, especially as regards, *a*, the respiratory function; *b*, the perspiration; *c*, the heat regulating functions, and *d*, the protective functions. 2. Theories based on the idea that death is due to excitation of the nervous system, such as shock or reflex exhaustion and loss of vascular forces. 3. Theories urging death as due to cardiac paralysis caused by cooled blood, overheated blood or poisonous substances in the blood. 4. Theories that explain death as due to alterations in the circulation, because the blood is "driven in" by the heat (earlier writers), or because it accumulates in the peripheral vessels or on account of thrombosis. 5. Theories that claim the fatal result is due to alterations in the blood itself due to destruction or loss of function of red corpuscles. 6. Theories that attribute death to the presence of poisonous substances in the blood, produced directly or indirectly in the burned areas.

"The clinical picture presented after extensive cutaneous burns is a striking one. The unfortunate victim, after a brief period of excitement and agony caused by the extreme pain, soon loses the power of much movement or resistance. The in-

telligence, at first fairly clear in spite of the great shock, gradually becomes beclouded. At times there may be delirium and cramps. The skin in the burned areas usually rapidly undergoes premature swelling. The pulse becomes very weak and rapid. . . . The respiration becomes rapid, irregular and shallow. The temperature, at first rising quickly above the normal, soon becomes subnormal in the rapidly fatal cases. There may be vomiting and diarrhea. The urine often shows traces of hemoglobin and albumin."

Now, after death, especially if this occurs soon after the burn, there may be no striking internal pathologic lesions, and irregularly distributed passive hyperemia of varying degree and small extravasations are often observed and cloudy swelling is usual. Occasionally gastric and duodenal ulcers are present. The blood shows well marked alterations, among which may be mentioned some rise of specific gravity, structural and also functional changes in the red corpuscles and a marked polymorphonuclear leucocytosis. Fragments of red blood corpuscles and blood pigments are found in the spleen, bone-marrow and lymphatic glands; thrombosis occurs occasionally in the capillaries and veins of some of the internal organs, and the majority of current text-books attribute death after burns to thrombosis.

Recently the view has become prominent that after burns toxic substances enter the circulation and cause the symptoms above quoted. This toxemia might be caused in various ways, but definite proof of the existence of toxic substances has not yet been offered. We know that in many infections and intoxications, spontaneous and experimental, certain

¹ Editorial in *Jour. Amer. Ass'n.*

quite typical lesions in the form of foci of necrosis may develop. Bardeen's demonstration of similar areas of cell death in the lymph follicles after burns is therefore very suggestive and point, in truth, to the existence of a veritable toxemia.

Bardeen had a chance to examine systematically the organs of five children that died at intervals of from four to nine and one-half hours after extensive cutaneous burns. Without going into details, the microscopic findings may be summed up as consisting of parenchymatous degenerations in the liver, the kidneys and the lymphatic tissues. Of these changes those in the lymphatic tissues are the most interesting because they were so widely distributed, because of their severity in spite of the short time between the death and the burn, and because of their specific and focal nature, pointing to the presence of toxic substances in the plasma. Thus there were found numerous areas of cell fragmentation essentially like those produced by the toxic substances in diphtheria in children as well as in experimental inoculations in animals with various so-called toxalbumins. The character of the lesions described by Bardeen furnish, therefore, important additional evidence of a toxemia after burns; destruction of red blood corpuscles and thrombosis did not seem to play so prominent a part in producing death as did the poisons in the blood plasma.

Spread of Tuberculosis in Guinea-Pigs.²

Modern research seems to have proved that there are at least two modes of extension of tuberculosis by other channels than the blood vessels. The main lymphatic vessels coming from the infected region form undoubtedly one of these channels and tuberculosis extends in certain animals, and probably also in certain human individuals, comparatively rapidly along this path. But bacilli, after a time, spread in the organism through other channels than these main lymphatics. This is shown by the gradual extension of tuberculosis against the stream of lymph in these channels. Thus, after infection of one limb, the other limbs and neck gradually become affected. After infection of the head, or of the mucous mem-

brane of the mouth on one side, the lymphatics of that side are first affected, but those of the other side and of the limbs on both sides become also rapidly tuberculous.

It seems about certain, therefore, that a tuberculous extension occurs not only through the lymph vessels and blood vessels, but also, as first shown by Delephine, by diffusion through the lacunar system of lymphatics.

Diffusion seems to take place in the guinea-pig, after subcutaneous inoculation: (1) From one side of the body to the other, more rapidly in the anterior wall than in the posterior wall of the body; (2) more rapidly from the head and neck to the lower limbs than from the lower limbs to the head; (3) more rapidly to the spleen than to other abdominal organs.

The more important results of a series of investigations of tuberculous guinea-pigs seem to show that the glands become infected much sooner than it was previously thought, and that the rapidity of infection is especially marked in the case of the spleen, which becomes infected on the fourth day.

The author's experiments also show that the blood of a guinea-pig, inoculated, with an emulsion made from a caseous gland, into the peritoneal cavity, was not infected on the second, third, fourth, or fifth day, while in the same animals the popliteal gland was infected on and after the second day, and that the spleen was involved by the fourth or fifth day.

Seventh Report of the Committee of Collective Investigation of the Anatomical Society of Great Britain and Ireland for the Year 1896-97.³

The first question was directed to ascertaining the frequency of an opening between the right and left auricles at the seat of the foramen ovale, and the reporters' summary with respect to this shows—

- (1) That an opening between the two auricles occurs in about a quarter of all cases, though probably, owing to its valvular nature, no blood passes through it.
- (2) That it is somewhat more frequent in females than in males.
- (3) That it is very frequent indeed in

² F. RADCLIFFE, *Owens College Medical Chronicle*.

³ F. G. KEITH and ARTHUR PARSONS in *Medical Chronicle*.

children under one year; after this its frequency decreases until the age of 20 is reached.

(4) That in adults over 20 the opening occurs about once in five cases.

(5) That the opening is situated in the upper and left quadrant of the fossa ovalis.

(6) That its size varies from 1 to 10 mm.

The second question deals with the arrangement and number of the lymphatic glands accompanying the common, external, and internal iliac arteries.

The number of observations on this subject was not large, but so far as it goes it shows that—

(1) The arrangement of glands on the right and left side of the same pelvis is not, as a rule, symmetrical; they are rather more numerous on the right side.

(2) There is a considerable difference between the arrangement in one body and another, both as to the number and position of the glands.

(3) The arrangement in male and female bodies shows no material difference in the position of the glands, but they are perhaps, more numerous in the male than in the female.

(4) The glands in children at birth, as in many of the lower primates throughout life, form an almost continuous chain; they are frequently of small size, and very few in number in old people.

(5) The glands are not usually so abundant as represented by Mascagni, from whose works most modern accounts are taken.

Another question was directed towards determining the position of the spinal accessory nerve, and particularly its relation to the jugular vein, the internal carotid artery, the atlas, and the sterno-mastoid muscle. As the result of a fairly large number of observations, the reporters state that—

(1) The spinal accessory nerve passes most frequently in front of the internal jugular vein, less frequently behind, and very occasionally through it.

(2) The side of the body makes no difference to these relations.

(3) The post jugular course of the nerve is somewhat more common in females than in males.

(4) In 82 per cent. of all cases the nerve pierces the sterno-mastoid muscle.

(5) The side of the body makes no difference to this percentage.

(6) In females the nerve pierces the muscle more frequently than in males.

(7) Very occasionally (about 1 percent.) the nerve divides, and only its superficial part pierces the muscle.

(8) When the nerve passes deep to the sterno-mastoid, it is more likely to have a post-jugular course than if it pierced the muscle.

(9) In almost every case it is the clavicular head of the muscle which is pierced by the nerve.

External Exploration in Obstetrics.*

Leopold is an earnest advocate for the adoption of a systematic and thorough external examination in every case of pregnancy, and also during labor. He would limit, to a great extent, the use of vaginal examination, and mentions the following arguments against it:—

(1) A woman during labor may be infected by an internal exploration, but never by the external one.

(2) These internal examinations are useless when external exploration gives the necessary information.

(3) The hands of the medical attendant, in regard to a woman during labor, should be considered to be septic, and they demand, in consequence, careful and laborious disinfection.

(4) The hands cannot be made germ free by rapid disinfection.

The external exploration of the abdomen comprises the following maneuvers:

(1) To determine the direction of the long axis of the infant, and also what foetal part occupies the fundus uteri.

(2) To recognize the position of the back and limbs.

(3) To ascertain the presenting part.

(4) Is the presenting part engaged in the true pelvis, and if so, to what extent?

In addition to this, information is also obtained by inspection, auscultation, and also by measurements of the pelvis.

This method has been used by the author and his assistants in over 1,000 cases, and it has been found possible, in a large

* LEOPOLD (*Annales de Gyn. Médical Chronicle*).

number of these, to conduct normal labor without having recourse to any internal examination. It is, however, quite otherwise in cases deviating from the normal. In these a careful internal examination is necessary; since if we avoid this we may fail to recognize certain pathologic conditions, and may also lose the most propitious moment for intervention.

It has been argued by some that external manipulation may have bad effects, such as causing irregular and painful uterine contractions, detachment of the placenta, and changes in the attitude of the fetus. Leopold, however, states that in his clinic no ill effects have ever been observed.

With each year, cases have become more rare in which mistakes in diagnosis of the position and presentation of the fetus have occurred. He sums up his experience as follows:—

- (1) It is possible to manage normal labor with the sole aid of external exploration.
- (2) It should be our duty to refrain as far as possible from internal examination in normal cases.

Are Athletes Healthy?

The athlete is so popular a person that we need not be surprised at the interest taken in the question, Is he healthy? If by an "athlete" is meant a "trained" man, one answer to the question is immediately obvious, viz., that whether he is healthy or not his health is not due to his training. If a demand arose, as in fact it does arise in military service, for men of endurance, of considerable muscular strength, of great and varied digestive capacity, able to bear exposure, starvation, and attacks of infectious illness with the least possible disturbance, and all the time fit for the exercise of the highest intelligence, then the training which produced such men would without doubt be conducive to health. But the training which athletes undergo does not even aim at such a condition. Its whole object is to produce the greatest possible output of muscular energy, to apply it with the utmost exactitude in a given direction, and at the same time to develop a state of body as to weight, etc., which shall conform to certain rules.

* London Hospital.

The routine by which these results can be most readily obtained is, no doubt, effectual for its purpose—but that purpose is not the production of health. An athlete, then, although often a very healthy man, by no means obtains his health by virtue of his training. Quite the opposite, in fact. Those who by build and constitution require severe regimen and training to make them fit for athletic work, and who drop out of condition as soon as they cease to train, may really suffer in health from the process—in the case of jockeys and others who train for weight they often do suffer very severely—while others who are always fairly fit may even benefit by the course.

When we come to consider what in these record-breaking days, an athlete has to do in his "sports" and in his practice (if we may draw a distinction between the practice and the regimen of his training), we are quite clear that the life of an athlete does not tend to health. We quite admit that a large number of healthy middle-aged and even old men are to be met with who have ardently indulged in athletics in their earlier years, but the fact that athletic sports are chiefly attractive to the strong and healthy makes the athlete so select a class that no comparison can be fairly drawn between them and the average man. Athletes are healthy because they are select, not because they are athletic. On the other hand, when we come to compare them with the average men we must remember that average men have many vices. We would not urge a young man to become an athlete in the modern sporting sense, but perhaps he would better even do that than oscillate between the office, the billiard room, and the whiskey bar.

Dr. W. K. Fyffe, of New Zealand, reports in the *Australian Medical Gazette* an interesting case of perforating gastric ulcer, of the posterior wall. The ulcer was not found till the autopsy, being impalpable from the serous surface.

Glasgow, *N. Y. Med. Jour.*, describes systolic sound in the brachial artery, aortic regurgitation being excluded, as a positive sign of aneurism, usually introthoracic. The sound is always present with aortic regurgitation.

1853-1897.

MEDICAL AND SURGICAL REPORTER

Issued Every Saturday.

Editorial and Publication Offices, 1026 Arch Street, Philadelphia, Pa.

EDITOR

HAROLD HAVELOCK KYNETT, A.M., M.D.

ASSISTANT EDITOR

G. C. CLIFTON HOWARD.

STAFF EDITORS

A. L. BENEDICT, A.M., M.D.
BUFFALO, N. Y.

A. A. ESHNER, M.D.
Ex-officio PHILA. CO. MED. SOC.

T. L. COLEY, M.D.
Ex-officio NORTH. MED. ASS'N.

THE BUTLER PUBLISHING COMPANY, P. O. BOX 843

H. H. KYNETT, M.D., MANAGER.

WILLIAM H. BURE, M.D., ASSISTANT MANAGER.

TERMS:—One year, three dollars in advance. Subscriptions may begin at any date.

REMITTANCES should be made by Draft, Money Order or Registered Letter, payable to the order of the Butler Publishing Company.

CONTRIBUTIONS of value to the medical profession are invited from all sources. Original articles, contributed exclusively to the MEDICAL AND SURGICAL REPORTER, will be paid for, after publication (payments made quarterly), or reprints will be furnished. Orders for reprints must accompany MSS. To ensure the return of contributions not made use of, writers must enclose return postage.

THE MEDICAL AND SURGICAL REPORTER will not be responsible for the opinions of its contributors.

PHILADELPHIA, SATURDAY, DECEMBER 11, 1897.

EDITORIAL.

IN A DOCTOR'S POCKET.

One of the prime secrets of success in general medical practice, is to be prepared for emergencies. Not that emergencies are usually directly profitable—outside of novels—but that the reputation which a physician makes of being always ready, or of usually being unable to meet an immediate demand, has much to do with the valuation placed upon his services by the general public.

It is not convenient always to carry a satchel, but a little ingenuity will render every physician, as ordinarily dressed, ready for at least the preliminary care of almost any kind of a case. Surgical and obstetrical cases can not be amply provided for in any small compass, but medical cases seldom require at the first moment more than can easily be carried in the pockets.

Diagnosis is of prime importance, and the thermometer and stethoscope should always be at hand. The former instru-

ment is carried in the vest pocket by most medical men; the latter usually is thought too bulky for convenient transportation. But light and portable forms of the instrument are easily procurable, and, on the whole, are quite as valuable aids as the old-fashioned and still favored clumsy Kamman models. One of the hip pockets serves well for the carrying of the stethoscope.

The hypodermatic syringe should be of durable construction, should be kept in working order, and should be accompanied by not too elaborate medicaments. It is easier to throw out part of a solution, or to combine two tablets, than it is to carry several sized tablets of the same drug, or a variety of readily made combinations. Atropin, morphin, strychnin, nitroglycerin, cocain, apomorphin, perhaps also hyoscin, are all the drugs needed for emergent injection. If one attempts to provide chemical antidotes for

poisons, the list soon becomes impractically large. However, it is well to include, if possible, copper sulphate for carbolic acid and phosphorus, potassium permanganate for morphin snake venom and general antiseptic use, and cobalt nitrate for cyanides. Astringents, local emetics, vegetable acids and alkalies can be obtained in any neighborhood.

A case for prescription blanks and cards is a business if not a professional necessity. A case not much larger may be made to serve for many conditions, by introducing one or two powders each of several valuable drugs not likely to be needed after the first dose, and by having a few small vials of such favorites as acetanilid, corrosive sublimate, aconite, alcohol, salol, and a good cathartic, relying on hypodermatic tablets for morphin, etc.

A small surgical case, with rubber ca-

theter, silk, catgut and a needle or two, with antiseptic powders in the pocket, will be of great service in many accidents and requires but a small additional weight.

Suspenders make an excellent tourniquet.

It is impossible to carry sufficient ether for use as an anesthetic, but a small vial of chloroform may be carried in the medicine case which will suffice for a brief operation or to maintain anesthesia while more is sent for.

Obviously, ideal surgery is impossible without careful preparation, and the use of means of disinfection are out of the question if portability must be considered. The physician in case of emergency must therefore stop to reflect whether extemporized surgery will be better or worse for the patient than delay till more thorough measures can be carried out.

CORRESPONDENCE.

AN OLD MSS.

EDITOR MEDICAL AND SURGICAL REPORTER:—There has come into my possession a thick folio of manuscript lectures on "Materia Medica and Practice," delivered in Philadelphia in 1823. Can some one inform me who the author might be? Who was professor of Materia Medica at that time? Mathew Anderson is written at the beginning. Books were

not a drug in the market in those days, and the students copied off the whole course, evidently, from the manuscript of the professor.

It is quaint reading at the present time.

Very truly yours,

P. J. FARNSWORTH.

Clinton, Iowa.

A CORRECTION.

EDITOR MEDICAL AND SURGICAL REPORTER: Sir—A word has been omitted from my paper on the "Radical Cure of Malignant Disease," etc., which appears in your issue of November 20th, page 649. The word *gold* has been omitted from the first sentence of the last paragraph on that page, and as the pur-

pose of the article was to call attention to the discovery that gold may be used to drive nascent mercuric salts into a cancer, I hope you will call attention to the omission.

Very truly yours,

G. BETTON MASSEY.

Philadelphia, Oct. 6th, 1897.

ABSTRACTS.

MODERN MANAGEMENT OF DIPHTHERIA AND CROUP.*

Since Behring's discovery of diphtheria antitoxin the management of diphtheritic inflammation has become totally different from the former empirical and unsatisfactory treatment. The acceptance of the Klebs-Loeffler bacillus as the specific causative factor in diphtheria has made it necessary to give a name to membranous sore throat in which the bacilli are not found, but in which various cocci are invariably present. This is at present called *pseudo-diphtheria*, and some modern textbooks therefore speak of primary and secondary *true diphtheria*, and primary and secondary *pseudo-diphtheria*. Although the mortality of pseudo-diphtheria is not so high as that of the Klebs-Loeffler variety, it is a dangerous disease, and as we cannot distinguish clinically one variety from the other, and as valuable time is lost in waiting for a culture test—which is not always conclusive—every attempt to adjust treatment in accordance with the bacteriologic classification must be looked upon as a failure in the present state of knowledge.

While fully cognizant of the scientific and practical value of bacteriologic research, I am ready to confess that failure to clear up doubtful cases by cultures, and in good time, is a daily occurrence. The physician will be wise to look upon all acute throat affections in children, attended with fever and swelling of the lymph nodes, upon membranous rhinitis without fever, or upon hoarseness with slow progressive stenosis, as suggestive of diphtheria and treat accordingly. The bacteriologic diagnosis of diphtheria may be made in several hours by means of Loeffler's glucose blood-serum and the incubator; still, to wait a few hours for a bacteriologic diagnosis is not wise. The culture test should be looked upon as confirmative and nothing more.

In tuberculosis, gonorrhea, typhoid fever, malaria, etc., the microscope estab-

lishes a positive diagnosis after which we may institute radical treatment, but in diphtheria *specific treatment comes first, the microscope last.*

A point worthy of consideration is the difficulty of distinguishing clinically between follicular tonsillitis and diphtheria. No amount of experience will enable the physician to distinguish between the two affections. What looks like a tonsillitis to-day may be a virulent diphtheria to-morrow; such cases should be isolated and treated as diphtheria. If a subsequent examination proves the contrary, no harm has been done. The physician who acts in accordance will have more success in the management of such cases, than he who poses on an ultra-scientific pedestal, waits for the culture test, and writes death certificates.

Although diphtheria is quite rare below the age of eight months, it is occasionally found in very young infants. During the past winter two cases of Klebs-Loeffler diphtheria came under my observation in babies less than three months old.

The membrane in true, as well as in pseudo-diphtheria, presents many variations from a thick and cheesy, to a thin and veil-like deposit; occasionally the surface appears as though smeared over with pus, and frequently we notice an infiltration of the mucosa without detachable membrane. The latter form may persist for weeks if antitoxin be not used, and if the local treatment be at all harsh and irritating.

Diphtheria runs its course as a mild case, a septic case or a stenosis case. We can never determine at the onset whether a case will progress favorably or terminate fatally. Its characteristics are the formation of a membrane, the presence of fever, indurated lymph nodes in the neck, sepsis, laryngeal stenosis. In membranous rhinitis, and membranous laryngitis, there is usually no fever.

* AUGUSTUS CAILLE, M.D., *The Post-Graduate*.

The following clinical varieties will be met with in practice.

1. So-called follicular tonsilitis.
2. Primary diphtheria of tonsils and pharynx.
- 3 Primary naso-pharyngeal diphtheria.
4. Primary nasal diphtheria; also called membranous rhinitis or diphtheria larvata.
5. Primary laryngeal diphtheria (membranous croup).
6. Diphtheria without membranes (simulating simple angina).
7. Secondary diphtheria, following measles, scarlet fever, pertussis, etc.

Diphtheria which simulates a simple or scarlatinal angina belongs to this group. Diphtheria in the anterior nares gives very few symptoms: a running nose, excoriation at nostrils, snuffles, no fever, is about all. This may go on for weeks, when an extension into the naso-pharynx or larynx is manifest by other additional or subjective symptoms. The Germans call this form *diphtheria larvata*, and in all such cases a culture will show the true state of affairs. Ordinary thrush (*oidium albicans*) can hardly be mistaken for diphtheria, but diphtheria of the mouth may be mistaken for stomatitis, and patches of leptothrix are frequently called diphtheria, particularly when associated with tonsillar inflammation, painful and swollen lymph nodes and fever.

Leptothrix patches will be found protruding from the crypts or margins of the tonsils, and are very difficult to scrape away; they also resist the action of various caustics to a remarkable degree, and sometimes make repeated scrapings and cauterization necessary.

The contagiousness of diphtheria is well established, but it is not so readily transmissible as scarlatina and other infections, and it can readily be prevented.

The proper management of the naso-pharynx in children and adults is one of the most important subjects in practical medicine.

The naso-pharynx is the usual site of entrance of diphtheria, and to this locality the preventive measures must be directed. Chronic nasal catarrh, adenoid vegetations, enlarged tonsils and carious teeth, favor diphtheria infection. In the absence of such conditions the instillation of a weak salt or alkaline solution into the

nose morning and evening will prevent diphtheria in those exposed or prone to contract it.

The naso-pharyngeal toilet advised by the author consists in the instillation into each nostril by means of an ordinary teaspoon, a spoonful of salt water, 1 per cent.; boric acid water, 2 per cent., or listerine, in water 10 per cent., morning and evening (at bedtime and on rising), as the children lie on their backs, with nose tilted up and mouth open. The liquid does not wash through at once; some of it remains in the various recesses of the nasal cavity, and is eventually sneezed out or swallowed. In this way putrescible matter and bacteria are washed away. (Mechanical antiseptis.) Where additional chemical antiseptic action is desired a 1.5000 mercuric bichloride solution, or Labarraque's solution, 10 per cent., or a rose-colored permanganate of potash solution should be employed.

The naso-pharyngeal toilet, carried out in the way described, is indicated for (1) all healthy children from one year up, who live in infected localities, and (2) for all healthy children directly exposed to diphtheria infection.

It is also the best method of local treatment in all cases of diphtheria, in which instances it should be resorted to every two hours; moreover, it is the most satisfactory local routine treatment in all diseases in which diphtheria frequently sets in as a complication, *e. g.*, in scarlatina, measles and pertussis; furthermore, it is a necessity *before* and *after* tonsillotomy and all operations on the nose and throat. This method is far superior to gargling, and the writer, after an experience of more than fifteen years with this method, again takes pleasure in recommending it on account of its great value and harmlessness. It has been tested in private practice and institutions, many physicians have employed it—bacteriologists have reported upon its usefulness, and have shown that weak solutions are as efficacious as strong ones.

In many forms of reflex cough, also of tubercular origin, it is far superior to nauseating expectorant mixtures, and in all forms of fibrile disease in which the nasal secretion becomes dry, crusty or hardened, half teaspoonful of salt water into each nostril affords much relief.

The naso-pharyngeal toilet not alone does not provoke middle ear accessory sinus complications, but, according to the experience of the writer, apparently prevents them.

Specific and direct immunity is secured for those exposed to diphtheria by means of antitoxin. The period of immunity varies from three to six weeks, which is sufficient for all practical purposes in times of epidemics or house infection. Aside from the reports which come to us from abroad, we have reliable reports from various hospitals for the treatment of children's diseases throughout the country which go to prove the absolute value of antitoxin as an immunizing agent. The immunizing dose is 200 units, and all exposed children should receive this quantity.

TREATMENT.

(a) By antitoxin. (b) Supplementary treatment.

(a) *Antitoxin.* Dosage. Indications.

The treatment for diphtheritic inflammation consists in the *early* and *proper* administration of *reliable* antitoxin, supplemented by the naso-pharyngeal toilet. The time for discussing the pros and cons of antitoxin treatment is past; the specific curative power of this remedial agent is an established fact. Behring's claim that if antitoxin be used early the mortality from diphtheria will not exceed 5 per cent., is borne out by the reports of competent clinicians all the world over. Opposition to anything so radically new, as Behring's discovery, is one of the associating features in the evolution of scientific medicine. Vaccination and antiseptic surgery stand in evidence of this fact. Any practitioner who studies the collective investigation reports for 1896 and 1897, on antitoxin for diphtheria and croup in private practice, issued by the American Pediatric Society, and fails to use antitoxin because he "does not believe in it," should not be entrusted with the management of a case of diphtheria, and the practitioner who thinks a case is mild, and waits for severe symptoms before using antitoxin, utterly fails to grasp the situation, and will frequently be disappointed.

Antitoxin is indicated in doses of 200

units for immunizing exposed persons, and in doses of from 1,000 to 2,000 units to combat the disease.

1,000 units for very young children.

1,500 units for other children.

2,000 units in croup cases.

It should be employed at the earliest possible moment, and the dose repeated the following day and subsequently as often as is necessary. I have given 10,000 units in one week to a child nine months old, and have seen no ill results. The dosage is expressed in units, and not in the serum quantity; the preparation having the highest number of units in the least quantity of serum, and from an *absolutely reliable source*, is to be preferred.

The injections are made in any region where a fold of skin can be picked up—the skin, the hands of the physician and the syringe must be *clean*. Any syringe will answer, but the best syringe is one made entirely of glass, and now obtainable in the shops.

The writer also injects a curative dose of antitoxin in every case of *scarlet fever* coming under his notice, because this disease is frequently complicated with diphtheria, and he also administers a curative dose in case of *measles* and *whooping cough* if the throat shows the slightest appearance of a pseudo-membranous patch. It would appear rational to give an immunizing dose in puerperal cases, where a diphtheria case exists in the same house; also to children on whom an operation is to be done in the nose or throat and where the culture test shows the presence of diphtheria bacilli without clinical symptoms. Antitoxin is also indicated in *diphtheria of the eye*, which is, fortunately, very rare. The more common croupous conjunctivitis is not to be confounded with eye diphtheria, in which the eyelids are phlegmonous and hard.

The antitoxin rash, which is noticed in a certain number of cases has no very characteristic features and may readily be mistaken for scarlet fever or measles rash; its appearance is usually not heralded by a rise of temperature and increase of other symptoms.

As regards the combined use of *anti-streptococci* and *anti-diphtheritic* serums in cases of mixed infection, no positive advice can be formulated at the present time.

The local treatment of diphtheria must be *mild*. Swabbing the throat in diphtheria is harmful, and should not be practised. Solutions used as gargles do not reach the naso-pharynx; the spray is only to be employed in cases in which force need not be used, *e. g.*, in docile children. The best way to cleanse the naso-pharynx is to pour the liquid into the nose from a spoon; if the nose is partly or almost completely stopped up, a blunt piston syringe, or a Davidson's or Fountain syringe must be employed. In septic cases the irrigation is best done as the children lie on the side in order to avoid any sudden strain and collapse. For the majority of cases, instillation by means of a spoon will suffice. This may be done every hour or two, and if necessary day and night, according to the severity of the case. If syringes are used the stream should be directed horizontally, and not upward. Syringes should not be used if bleeding follows each irrigation.

The following liquids may be employed.

Permanganate of potash—rose-colored aqueous solution.

Mercuric bichlorid in water, 1—10,000.

Listerine, 1 to 10.

Salt water, teaspoonful to pint.

Lime water.

Alum water, 5 per cent.

Peroxide of hydrogen has shown itself

Peroxide of hydrogen has shown itself to be an active irritant in the hands of the author, and aids the spread of diphtheria, and should therefore not be used in diphtheria.

Any of the above liquids may be used as a gargle when children are able to gargle. *Excoriations* at the angles of the mouth, and at the nostrils, usually heal under camphor ice.

Antitoxin, with mild local treatment and judicious stimulation, will suffice for ordinary cases seen in good time; but as cases will come under observation, in which valuable time has been lost in temporizing with household remedies, the physician will not be spared the management of various *complications* which will now engage our attention.

Medication. The local antiseptic power of a teaspoonful of medicine, as it glides over the tongue and down the oesophagus, is practically *nil*. The yellow chlorate of

potassium and iron mixture, and the mercuric bichloride mixture, will not be necessary where antitoxin can be had, and should under no circumstances, be given to a patient with an irritable stomach. As an aid to digestion the following mixture is efficacious:

R

Fairchilds ess. of pepsine, $\frac{3}{4}$ ii.

Acid muriat dilut. 3 ss.

Teaspoonful 4 times a day.

In septic cases, 5 drops of the tincture of chloride of iron may be given every four hours.

Stimulation. Whiskey, American Tokay wine, champagne, coffee, strychnin, gr. 1-50, three times a day. Camphor, gr. $\frac{1}{2}$ to 1, three times a day. Benzoate of sodium and caffein, dose, grs. 1—3, also subcutaneously dissolved in water. Camphorated oil and ether, equal parts, 5 to 15 drops, subcutaneously. When the stomach is irritable, stimulating drugs can be given subcutaneously or per rectum.

Fever. High temperature can be reduced by cold and luke-warm sponge and tub baths. To give an antipyretic drug regularly every two or three hours is very bad practice; one or two doses in twenty-four hours, particularly at night, are serviceable. From 3 to 10 grains of phenacetin with $\frac{1}{2}$ grain caffein or lactophenin with caffein in the same dose may be given. Antipyrin is a safe antipyretic, and as it is soluble in water, from 3 to 7 grains can be given per rectum. In cerebral unrest an ice cap is advisable. Quinia should never be given as an antipyretic in any but malarial disease.

Vomiting. In cases of incessant vomiting, stop all internal medication and give only 1 to 2 drops tincture of iodine in sweetened peppermint water every hour or two, or wash out the stomach.

Diarrhea. In many septic conditions a mild form of diarrhea may complicate matters. This can usually be checked, if necessary, by a diet of burnt flour, gruel or cornstarch pap, and by omitting milk food for a time. Should this not suffice, 5 grains of tannic acid or tannigen given with chocolate, or $\frac{1}{2}$ grain of acetate of lead with sugar of milk, or $\frac{1}{2}$ grain of camphor with 1-5 grain of Dover's powder will check the diarrhea.

Albuminuria and nephritis are frequent

complications of diphtheria. A stiff dose of calomel and jalap, and one or two warm baths a day to promote diaphoresis, will be the treatment in such conditions. In nephritis, with dropsy as a sequela of diphtheria, an infusion of digitalis may act as a diuretic by improving the circulation.

Convulsions. Initial convulsions indicate intense infection or nervous reflex irritability, for which an enema, a warm bath, and hydrate of chloral, grs. iii., and potassium bromid gr. v. are indicated, per os or per rectum. Terminal convulsions, indicating heart failure and cerebral inanition, give an unfavorable prognosis. A warm bath and stimulants are here indicated: 5 drops of camphorated oil and 5 drops of ether subcutaneously every few hours.

Dry Tongue. The tongue is sometimes so hard and dry that pain and difficulty in swallowing result. For this condition glycerin and rose water, equal parts, applied with a brush, affords relief.

Pseudo-membranous conjunctivitis is occasionally seen in severe diphtheria cases. This readily yields to ice compresses and the boric acid spray. In true *diphtheria of the eye*, in which the eyelids are much swollen and indurated, antitoxin must be used in large doses. Fortunately, as has already been said, this condition is very rare.

Otitis media, due to an extension of the septic process through the Eustachian tube is frequently observed, but the ear-ache is not nearly as intense as in ordinary otitis media and rupture of the drum head takes place readily. The ear should be cleansed with mercuric bichlorid solution 1:5000, or a warm boric acid solution with cocain, or menthol in sweet almond oil (3 j to 3 iv.) should be instilled.

Hemorrhage from sloughing of the tissues is a very dangerous and distressing complication. If possible, the bleeding spot should be located by means of a strong light, and directly cauterized with the actual cautery, lunar caustic, chloride of zinc, alum solution, or antipyrine and tannin. The styptic iron preparations are not so applicable on account of the large grumous blood clots which invariably form.

Phlegmon and induration of the tissues of the neck, with indistinct fluctuation of cervical lymph nodes, are best managed by a large incision through the entire dense and thick skin down to the glands. The latter are usually in a friable, spongy state, with little pus spots scattered through the tissue and can readily be broken up by pushing a blunt director or dressing forceps through the capsule and sweeping it around in various directions in order to break up the necrotic tissue. Make one abscess cavity which can readily be drained by means of iodoform or bichloride gauze under a moist dressing. The neighborhood of such a diphtheritic and gangrenous wound occasionally has an erysipelatous appearance, which usually subsides under the application of cold lead lotion.

Paralysis of the soft palate is not rare. A stationary palate, a nasal voice and food regurgitation through the nose, are the characteristic symptoms. For this condition, as well as for the *temporary locomotor ataxia*, which is occasionally observed, we require fresh air, baths, massage, the interrupted current and 1-50 grain of strychnia, three times a day, by mouth or under the skin. The antitoxin treatment has not made paralysis cases more frequent, nor does it appear to facilitate the recovery from such complications.

A gradual paralysis of the respiratory muscles, including the diaphragm, as shown by a weak cry and rapid superficial breathing, is a very serious condition to deal with.

In addition to the general treatment just announced, the cold douche and artificial respiration may do good. *Sudden death from heart paralysis* gives no chance for treatment. In all cases of septic diphtheria, early and proper stimulation may prevent it.

The anemia, which is known to follow in the wake of diphtheria and other infectious diseases, demands tonics such as fresh air and iron. I have publicly protested against the detention of children in ill-ventilated apartments of tenements and flats, by the local Health Board, for weeks after an attack of diphtheria, and until all bacilli have disappeared from the throat; and I believe the majority of physicians will be of the same opinion on the question. *Broncho and lobar pneumonia*,

thrombosis of veins and arteries, and other remoter complications, will come under observation, and will call for proper management.

The diet in diphtheria is of prime importance, the food should be nutritious and digestible.

Milk, vichy, matzoon, koumyss, beef peptonoids, corn starch, custard, icewater, cream, farina, cocoa, eggs, raw meat, burnt flour soup, whiskey, California tokay, coffee, tea, punch, ice, champagne, pineapple juice, somatose.

Forced feeding is proper in exceptional cases, but it is well to remember that children with febrile and septic disease have little desire for food, and that the stomach will resent all attempts at over feeding. Somatose is an ideal soluble meat without taste or smell, and can be given with cocoa, milk, gruel, rice, etc.

For *rectal alimentation* we inject a mixture of whiskey, egg yolk, beef, peptonoids, warm water.

Gavage will be mentioned in the chapter on croup.

CROUP.

In practice we recognize (1) a *croupy cough*, without stenosis; (2) a *catarrhal or pseudo-croup* with dyspnea, and (3) *true croup*, in which the stenosis is progressive and frequently necessitates operative interference. The croupy cough is common in children with adenoid vegetations, follicular pharyngitis or large tonsils; it usually begins at night and yields to the mildest treatment. A cloth wrung out of cold water around the neck, salt water dropped into the nostrils and a hot drink is all that is necessary for the time being with subsequent curettage or cauterization of the swollen follicles in the pharynx. Emetics are not indicated, although very popular with that class of parents who delight in goose grease and turpentine.

As a type of *pseudo-croup* with dyspnea, the croup of measles is characteristic. Here we have to deal with catarrhal laryngitis or edema of glottis, which rarely goes on to complete stenosis; the treatment is the same as for "croupy cough." Only in extreme cases will local scarification of the edematous tissues or intubation be necessary. The so-called *true croup* is either a primary membranous laryngitis or is secondary to diphtheria of the naso-phar-

ynx. In primary membranous croup the pharynx is pale, and the temperature normal, and the onset is never sudden; hoarseness, aphonia and stenosis come on gradually, whereas in pseudo-croup the onset is generally sudden, the pharynx is usually congested and there is fever.

About 80 per cent. of membranous croup cases are known to be cases of Klebs-Loeffler diphtheria; in about 20 per cent. this bacillus has not been found. True croup should, therefore, be quarantined as diphtheria.

The secondary croup with stenosis is either due to an extension of the membranes downward or to the swelling and edema of the tissues adjoining a diphtheritic patch. Urgent laryngeal stenosis, secondary to various forms of nose and pharynx diphtheria, is, therefore, *not necessarily membranous*, but the treatment is practically the same in both instances.

Before the advent of antitoxin the best treatment for true croup, before operation, was *mercury or calomel*, internally, by injunction or by fumigation, and it is well known to experienced physicians that intubation and tracheotomy gave better results when mercury had been administered. Mercuric bichlorid, gr. 1-32, was given every hour for 1-2 days, or 20 grains of calomel were volatilized over a lamp, under an improvised tent, every three hours for twenty-four to forty-eight hours. The spray and croup kettle have very little value, and emetics in any shape are productive of evil. I have never seen membranes dislodged by emetics, except in instances where they came from the pharynx or surface of the epiglottis, and I am positive that they sap the strength of the patient. Now that we have specific treatment we will not discuss in detail our former management of croup cases, because the best treatment of croup, before operation, can be mentioned in one word—*antitoxin*. Here again, I refer the skeptic to the report of the American Pediatric Society on laryngeal stenosis, which tells the whole story, reflecting, as it does, the experience of hundreds of physicians, and sifting the evidence in a judicial manner. Briefly the report says: Before the use of antitoxin 27 per cent. of intubation cases recovered; now 73 per cent. recover. Sixty per cent. of stenosis cases do not require

operation if antitoxin be used in time, and an early use of antitoxin will lower the mortality of intubation cases still more.

The writer's personal experience can be summed up in a few words. Tracheotomy and intubation cases, before antitoxine, 280 cases, 30 per cent. recoveries; 17 intubation cases, with antitoxin, 3 deaths. Over one-half of all laryngeal cases treated with antitoxin, recovered without operation. In every case of acute progressive stenosis 1,500 to 2,000 units of diphtheria antitoxin, should be administered at once, and the dose may be repeated in twelve to twenty-four hours, and so on, until relief is manifest. As soon as the stenosis becomes less urgent, and the cough somewhat loose, the main danger is over, and camphor, gr. $\frac{1}{2}$, or spir. ammoniæ, aromat., gtt. x., may be given as an expectorant and stimulant, four times a day. The same management should be resorted to in urgent stenosis following scarlet fever, measles, pertussis or naso-pharyngeal diphtheria, or so-called tonsillitis, together with the naso-pharyngeal toilet, as before described. When antitoxin fails to check a progressive stenosis, the time for operative interference is close at hand. The proper time for the operation is a matter of experience; the physician should not wait until the patient is cyanosed and the pulse intermittent.

Intubation is the art of introducing tubes into the larynx and removing them at the proper time. In combination with antitoxin, intubation is one of the greatest blessings at the disposal of the physician. Dr. J. O'Dwyer, of New York, is the inventor of our present method of tubing for croup. The instruments he devised have been in general use since 1886, and although a number of modifications have been suggested, none has come to the writer's knowledge which is in any respect an improvement on the original method with the exception of Denhard's gag, which is universally used. Many of the modifications are useless and bad. The operation of intubation and extubation is not, in itself, difficult but every one contemplating becoming a safe operator should practice the operation on the cadaver. Its *modus operandi* cannot be learned from text.

It may be in place to dwell briefly upon some important points as regards feeding and medication, duration of wearing the tube, intermittent intubation, the management of cases where the tubes have been coughed up, secondary stenosis from cicatrix, granulations or edema, selection of special tubes for edema of epiglottis and ventricular bands, retained tubes, etc. A new, or a newly-plated tube, should be used for each case.

If the operator be in doubt as to the proper size, the smaller size should be chosen. The tube may be disinfected immediately before using, in boiling water, and a minute quantity of iodoform ointment may be used as a lubricant. When the tube is in the larynx, and not blocked by detached membranes, a characteristic moist rattle will be heard as the air is forced in and out in respiration. Before removing the gag the left index finger is rapidly passed to the head of the tube to determine positively that the tube is in its proper place, then the string and finally the gag are removed. It is best not to use a string which is too strong to be broken, for in case it should become wedged in its eyelet, the string may be broken away with the index finger at the head of the tube to prevent dislodgement.

If a detached membrane has been forced down, the child will become cyanotic, whereupon the tube should be pulled out by its string and reintroduced after the detached membrane has been expelled by coughing. If a tube is coughed up after having been in the larynx a day or two a re-introduction is not necessary until urgent symptoms demand it, and if a child has great difficulty in swallowing food the tube may, in exceptional cases, be taken out once a day for the purpose of proper feeding. The writer many years ago suggested intermittent intubation for purposes of feeding.

Feeding. Some children will swallow liquids without difficulty, others will swallow semi-solids best, such as custard, scraped meat, ice-cream, sponge cake soaked in milk, hard yolk of egg, farina with egg or somatose, matzoon, ice. Most children will swallow well in the dorsal-horizontal posture. Forced feeding by means of a tube (Gavage) may become necessary, the tube being introduced through nose or mouth.

Medication. Stimulants, heart tonics, antipyretics can be given with the food or subcutaneously or per rectum. Tubes may be removed after two, four or six days. Antitoxin has shortened this period very much. When it is noticed that a greenish muco-pus is coughed up through the tube it is time to remove it. To avoid pressure-necrosis, a tube should not remain longer than six days.

A stenosis which occasionally persists in intubation cases is usually the result of traumatism, *i. e.*, laceration during attempts at intubation, and pressure-necrosis from badly constructed tubes too long in the larynx and roughened by calcareous deposit. Cicatricial stenosis or granulations will be found at the entrance of the larynx at the base of the epiglottis. In my own cases such a distressing complication has not happened, but two such cases have come under my notice, in one of which there was also obstruction due to granulation tissue and edema in the subglottic region. Such cases require expert management, and each case will need its own treatment. Hard rubber tubes for long wear, built-up tubes with extra large heads and large retaining swell are called for. Accessible granulations may be removed, superficial granulations may be attacked by coating the tubes with gelatin and alum or tannin, as suggested by O'Dwyer. In some cases tracheotomy must be done, with subsequent local treatment and dilatations. Specially built-up tubes are also used when swollen tissue over-rides the head of ordinary tubes in primary intubation.

Secondary stenosis, after intubation, due to abduction paralysis, has been reported, but lacks confirmation. Antitoxine and intubation combined have given such brilliant results in croup that tracheotomy is now rarely performed in this country for diphtheritic-stenosis. In certain cases, however, it may be employed in preference to intubation.

DISINFECTION OF THE SICK ROOM.

The general principles involved in the prevention of infectious diseases are not complex:

1. Isolation of patient, and avoidance of sick-room.
2. Disinfection of rooms and contents by steam or chemicals, or by cleanliness and sunshine; personal disinfection and

prophylaxis, including fortifying the system.

3. Ventilation to prevent concentration of poisonous matter.

The management of diphtheria and scarlet fever in a private house according to these principles is not difficult. The patient is isolated in a clean room, bare of all but the necessary furniture. A hall bedroom, or one on the top floor, is to be preferred. In some instances it may be advisable to keep the patient in the ordinary bedroom occupied at the time of taking sick, and quarantine, in the best manner possible, this floor of the house already infected. The well children are to be kept from school and church. Where the intercourse of parents with a sick child cannot be avoided, even when trained nurses are employed, it may become necessary to isolate the well children. Food and drink not consumed by the patient must be burned or disinfected in a slop jar holding a chlorinated soda solution. Dishes should be rinsed in soda solution, 5 per cent., and a sublimated solution 1:1000 before returning them to the kitchen. As dried sputa are liable to spread through the air, all expectorated matter should be received by rags or paper spittoons, which are to be burned, or into a jar holding a sublimate solution, 1:1000. The sick-room should not be swept with a broom, to avoid raising dust. For cleaning purposes employ moist rags, which are to be burned. Urinals, bed-pans, and feces are treated with quicklime, bichlorid solution, 1:1000, or Labarraque's solution.

The nurse should not eat or drink in the same room with the patient, and before going to meals she should clean her hands and arms with green soap and sublimate solution, 1:1000, and put on a clean, long, loose gown, which hangs outside of the sick-room. During the period of desquamation, the patient should receive a daily bath of tepid water containing green soap. At the termination of a case the nurse takes a bichlorid bath, 1:2000 and washes her hair with the same solution. In case of death, the body is to be wrapped up at once in a bed-sheet soaked in mercuric bichlorid solution, 1:1000, and no public funeral is to be permitted. The sick-room and all objects in it must be disinfected. Hard finish or

painted walls and ceilings and floors may be washed or sprayed with disinfecting fluids. Papered walls may be rubbed down with a damp cloth or bread crumbs; or, better still, the paper should be removed. A fresh coat of kalsomin or whitewash is advisable wherever it can be applied. After disinfection the windows must be kept open day and night for several days. Carpets, upholstered furniture, and other articles, can be disinfected by steam through the Health Board, or at private disinfecting plants.

Recently formalin vapor has been extensively used for disinfecting sick-rooms and their contents, and so far as my experience goes, I consider it to be a powerful disinfectant, far superior to sulphur.

Formalin vapor is generated in an apparatus which permits the gas to be discharged by means of a tube through the keyhole into a room which is otherwise tightly closed. Quite recently formalin lamps have been introduced by Shering & Glatz, for use in families, in which formalin is generated by heating tablets of para formaldehyd over a lamp.

In regard to the question as to when it will be safe to send children who have had diphtheria back to school, we should judge by the culture test. Whenever this test cannot be employed we should wait at least three weeks from the disappearance of clinical symptoms, during which time the naso-pharyngeal toilet should be diligently carried out.

UMBILICAL AND VENTRAL HERNIA.*

The importance of studying carefully the best methods of treating hernia is now emphasized because of the increased frequency of this disease following laparotomy, and especially because the improved technic in surgery makes the operation far less dangerous than it formerly was. In fact, the operation for radical cure of hernia, which was until recently considered by most of the leading surgeons of this country unjustifiable because of its great mortality and the unsatisfactory results, is now, in the practice of the best surgeons, except in extreme cases, practically devoid of danger, and the patient may be permanently cured.

Until we learned the value of surgical cleanliness surgeons were consistent in their refusal to perform this operation, because infective peritonitis was so constantly fatal. Modern antiseptic and aseptic precautions have practically excluded this danger, and with its exclusion the patients recover from the operation, and the divided structures unite primarily and bring about a condition that more permanently resists subsequent strains. Hence they not only recover from the operation, but usually have no return of the hernia for many years, if at all.

To prevent hernia following laparotomy it is necessary to get perfect union by ad-

hesion of all the layers of tissue forming the abdominal wall—the peritoneum, muscles, the deep and superficial fascia, and the skin. But especially must we get union of the layers of fascia, for unless this be done the other layers will gradually separate and hernia will follow. This cannot be done unless we succeed in bringing the cut edges of the fascia in even and perfect apposition long enough for strong union to occur. This is impossible if there is suppuration in the wound, and is generally impossible unless the several layers of tissue be separately united by the buried suture. In operations for large tumors where the abdominals walls are relaxed so that there is no tension upon the wound, all the layers may be evenly and perfectly brought together, and good results may follow, by uniting the incision with interrupted sutures carried through the entire thickness of the abdominal wall. But in four-fifths of the operation that are now done these conditions do not exist, and there is necessarily more or less tension immediately upon the sutures. Hence we have no assurance that the several layers are brought into apposition, except it be done by separate union with the buried suture. Some operators claim that they have not had hernia following laparatomies, and that they have sutured the abdomen after any fashion that at the time suggested itself

* WILLIAM H. WATKIN, M.D., Louisville, Ky., *Am. Jour. Obs. and Gyn.*

to them; but if these men will look more carefully into the subsequent history of their cases, they will find that hernia is more frequent than they had supposed. I did not believe in my earlier laparotomy work, that hernia would follow my operations, and I was bold in asserting that I had no hernia complications; but I now find that I have, and in some of the cases where the immediate conditions were apparently the most favorable and permanent.

Of course until recently the buried suture could not be used because of the imperfect knowledge of the best means to protect the wound against infection. This objection having been practically overcome, almost any suture may now be buried in tissues, if properly introduced, and will not cause suppuration. It is necessary to introduce an aseptic suture into aseptic tissue and exclude it from the atmosphere. There is a precaution, however, in addition to perfect cleanliness, that must always be observed in the use of the buried suture, otherwise we may have suppuration. It is next to impossible to do any operation that is *absolutely* aseptic, as there may be a few bacterial spores in the wound or upon the suture; but these are readily taken care of and destroyed by the cellular elements, unless the power of resistance is impaired and conditions favorable to their development are furnished. If the sutures are drawn too tightly in all of the layers, or at any point, the normal blood and nerve supply to the part will be interfered with, the resisting powers to bacterial development weakened, and suppuration may result. In my former operations with the buried suture this difficulty was annoying, but with a broader experience I now have but little trouble in this particular. I have several cases in the Infirmary recovering from laparotomy where the incision was closed with the buried suture; union is perfect, and the tissues about the wound are nearly as soft as the other parts of the abdomen. I prefer the kangaroo tendon, because it is easily made and kept aseptic, and when chromicized holds its integrity long enough to insure perfect union of the surfaces. I do not consider catgut so reliable, unless it is prepared by some person practically familiar with the best methods of sterilization, and there is danger

of too rapid absorption unless it has been carefully chromicized. The entire wound should be closed by the buried tendon. It may be done by the cobbler's stitch, after the fashion of Dr. Henry O. Marcy, or by the continuous and blind stitch, and then hemetically sealed with iodoform-collodion with a few fibres of absorbent cotton spread over the incision.

The revolution in the treatment of hernia in the last twenty-five years has been remarkable. Especially is this true in regard to the treatment of umbilical hernia. It appears that the first operation in America during this century, for the radical cure of umbilical hernia, was successfully performed by Dr. Horatio R. Storer, of Boston, in 1866. He was severely criticised by the surgeons of Boston and of this country for attempting such a foolhardy operation. I do not think that any successful surgeon would now decline to operate upon a well-marked umbilical or ventral hernia; and it is the correct thing to operate for radical cure as soon as the hernia is well developed, for the operation is then practically devoid of danger, if properly performed, and the permanent results will be far better than if let alone until the hernia has grown large and complications have arisen that make the operation a difficult one. One of the serious questions formerly considered was the treatment of the sac because of infective peritonitis when it was opened. This danger no longer exists, and in operating for radical cure of a large or old hernia the sac should be sutured at its base and removed. There is no other method of treating the sac that from a surgical standpoint is rational or that brings about a condition approximating the normal condition. These operations, except in cases of strangulation or extensive adhesions, are little more dangerous than an ordinary exploratory laparotomy. But, of course, great care in bringing together the layers of tissue must be observed if we want to prevent a recurrence of the trouble. Fortunately the adhesions are usually omental, which are easily separated and cause no trouble. If there are intestinal adhesions this is a complication that must be carefully managed, so as not to impair or destroy the integrity of the bowel. Sometimes in fat persons the sac is filled with an omentum

so large that it cannot be returned unless the ring be widely divided. In these cases, especially if the adhesions are extensive and the omentum somewhat injured in separating them, it should be ligated in sections and removed. This adds very little to the danger of the operation, for large quantities of omentum may be removed with impunity. If the contents of the sac, when all the adhesions are separated and the recti muscles relaxed, cannot be returned into the abdomen without too much and too long efforts, the ring of the hernia should be enlarged; but usually a little nicking at one point of the constriction will be sufficient. When the contents have been returned the thin skin over the hernia should be cut away, and the peritoneum should be resected a little beyond the bottom of the ring, so as to better refreshen the edges above and to be more positive of getting an even, smooth peritoneal surface when it is united. It may occasionally be better to resect the ring also. The peritoneum should be closed by a continuous suture instead of ligation in mass. When the sac is removed and the peritoneal edges brought together, the remainder of the operation is extraperitoneal and may be completed without risk of soiling or infecting the abdominal cavity. It is necessary to refreshen every part of the surfaces before we attempt to unite them,

and to split the tissues, and if possible, expose the fascia so that it also may be united. The number of layers of suture necessary to close the wound will depend upon the thickness of the wall; but two or three layers will be needed in a thin wall, while four or five may be required in a thick wall. If the hernia is small and the parts come easily in apposition, it will not be necessary to use any suture except those that are buried; but in fat people with old and large herniæ it may be better to introduce several silk or silver wire interrupted sutures half an inch from the surface of the incision down nearly to the peritoneum, to act as splints or supports to the buried sutures until firm union has occurred. In such cases, unless the kangaroo tendon or the catgut is large and thoroughly chromicized, it is probably correct to use the silk suture, because it will positively not be absorbed or weakened in its resisting power until union is perfect. If the wound is entirely closed by the buried suture, the best dressing is iodoform-collodion, as recommended after a laparotomy. These patients should be kept in bed for two weeks after the operation, with a binder tightly fitted around the abdomen; and when they are permitted to sit up, and for a year afterward, should be required to wear constantly a tight and evenly-fitted abdominal support.

ACQUIRED IMMUNITY FROM DISEASE.*

Apparently, acquired immunity consists essentially of an acquired power of tolerance, by virtue of which the cells concerned are able to perform their functions in spite of the presence of toxins. In the case of the cells specially concerned in zymotic diseases—i. e., those concerned in the destruction and removal of the pathogenic micro-organisms and their toxins—this acquired power enables them the more readily to produce the two or more digestive bodies inimical to the ferments and their toxins. But if an animal which has not acquired immunity (in the case of diseases against which permanent immunity may be acquired), or which has lapsed its acquired immunity (in the case

of diseases against which permanent immunity cannot be acquired), be infected, then the cells concerned being poisoned may not react at all—i. e., may fail to produce their digestive bodies, when the proliferation of the invading microbes and the elaboration of their toxins will continue unchecked and the animal will perish; on the other hand, in an animal which has not acquired immunity, or which has lapsed its immunity, the inborn powers of resistance of the cells may be, and is, as regards most animals in relation to most diseases, so great that they are able to produce the digestive bodies to some extent from the first in spite of the presence of the toxins, and therefore most animals are capable of recovering from most of

* Editorial in *Lancet*, London.

the diseases to which they are liable. Digestion—i. e., attenuation—of the toxins then occurs, till in time there are present in the animal's blood toxins in all stages of digestion, from virulent toxins newly produced and hardly affected by the enzymes, to toxins long produced and so enfeebled as scarcely to deserve the name; and, as reasoning by analogy we may suppose, up that graduated scale it is probable the cells of the animal react till complete immunity is attained, just as the cells of an animal affected by rabies and anthrax react when treated to the less finely graduated oxins provided by Pasteur's treatment.

Moreover, if the blood serum of such an animal be removed and injected into a susceptible subject, either one not yet infected, or if effected, one the cells of which are not poisoned beyond the power of reaction, this second animal also will thereby be provided with a means of achieving immunity. If he be not infected the altered toxins will provide him with a scale of graduated poisons up which his cells may react toward complete immunity, the completeness of the immunity acquired by him being proportionate to the virulence of the toxins at the more poisonous or least digested end of the scale. If he be already infected, not only will the injection provide him with a scale of graduated toxins, but it will also provide him with digestive bodies wherewith to attenuate the toxins which are then being elaborated by the micro-organisms infecting him. But of course the blood serum of an animal which has been infected and is recovering from the disease will be infinitely inferior in curative and immunizing power to the serum of an animal into which the large quantities of toxin (elaborated in an artificial medium) have been injected in oft-repeated doses extending over a length of time, since in the latter case the quantity of attenuated toxins and digestive bodies will naturally be much greater than in the former.

It further follows that, if we mix toxins with fresh antitoxic serum *in vitro* at a suitable temperature and for a sufficient length of time, the digestive bodies present in the latter will attenuate the former, and therefore, that much larger doses of toxins can be administered without death in this way to a susceptible animal than in

any other. Professor Fraser contends that, since antitoxic serum when mixed with toxins *in vitro* "neutralizes" the latter more effectually after twenty minutes' contact than after contact of five minutes, proof is thereby supplied or a probability raised that such a neutralization is a chemical one in the sense meant when we say that an acid is neutralized by a base; but surely when we remember the comparative rapidity of chemical and the comparative slowness of physiological reaction the probability is that we have here to deal with a digestive process rather than a mere immensely chemical combination, a probability strengthened by the consideration already dwelt upon that it is hardly likely that the animal body is a magic bottle producing at need the right toxins on the right occasion.

strengthened by the consideration already dwelt upon that it is hardly likely that the animal body is a magic bottle producing at need the right toxins on the right occasion.

Various other considerations add strength to the belief that acquired immunity against any disease depends essentially on a gradual habituation to its toxins, or an increased power of physiological resistance, as a result of which cells are enabled to perform their functions in spite of the presence of the toxins (which indeed do then but stimulate the cells specially concerned—i. e., those which produce the digestive bodies), not on the production of chemically antagonistic substances; and further, that the persistence of immunity depends on the persistence of this power, not on the continued persistence within the system of antidotal substances, whether chemical (in the narrow sense) or digestive.

Duchenne advocates liberal allowances of water in typhoid, to aid in carrying off waste matter, especially when the Brand baths cannot be used. We presume that the excessive diarrhea would be a contraindication, but there are few diseases in which water, ad libitum, is not beneficial.

Comby, *L'Union Médicale*, states that cases reported as precocious menstruation have proved to be due to other hemorrhages, especially from granulations about the meatus.

SOCIETY REPORTS.

PHILADELPHIA COUNTY MEDICAL SOCIETY.

Stated meeting, November 24, 1897.

The President, DR. JAMES TYSON, in the Chair.

DR. T. B. SCHNEIDEMAN read a paper entitled:

**A Case of Sympathetic Ophthalmia
Terminating in Recovery.**

(See page 705.)

DISCUSSION.

DR. EDWARD JACKSON said that sympathetic ophthalmia is a disorder of such grave importance that every case should be placed on record. The disease is a rare one. He had seen but three cases, one of which he reported to this Society in 1887. Although the affection is often extremely painful after plastic exudation has taken place, and may continue so after vision has become almost totally lost, its invasion is liable to be insidious and unattended with pain, and may be neglected by the patient. A few years ago importance was attached to the recommendation not to enucleate the exciting eye in the early stage of active inflammation, because this was followed sometimes by aggravation of the symptoms in the sympathizing eye. This recommendation was never universally accepted; and, during the past ten years a number of cases have been reported in which prompt operation has been followed by recovery. This is now regarded as the established proper course; and it is well to follow enucleation with the free use of mercury.

There are some reported cases in which there is a good deal of question about the diagnosis of sympathetic ophthalmia, but in the present case there are the three elements of the injury to the exciting eye, the interval of time, and finally the characteristic inflammation, as far as the local conditions are characteristic of sympathetic ophthalmia in the sympathizing eye. The case was seen by several who are familiar with the disease, and there was no question in the minds of any but that the case was one of sympathetic ophthalmia. The results are exceedingly gratifying and in all probability the cure is complete.

Cure cannot be regarded as complete until two years have elapsed, and in cases of sympathetic ophthalmia relapses continue to occur through long periods of years and sometimes after months of comparative immunity. It is doubtful if in any case in which such complete restoration has occurred and for the length of time reported in the present case, the disease recurred.

DR. ORVILLE HORWITZ read a paper entitled

**An Expedient to Determine Positively
whether a Communication Exists between
a Fistulous Opening in the
Lumbar or Hypogastric Region and
the Bladder or the Kidney.**

(See page 707.)

DISCUSSION.

DR. HORWITZ said that in some one hundred cases of acute urethritis in which he had been using methylene blue to see what effect it would have on the gonococcus, careful examination failed to disclose the presence of albumin in the urine. In some of the cases the arsenic said to be present in the methylene blue gave rise to acute diarrhea and the dose of the drug had to be reduced or the treatment entirely discontinued. In other cases two-grain doses produced strangury. In four cases in which decided strangury occurred there was acute albuminuria, such as is encountered in cases of acute posterior urethritis, but as soon as the drug was discontinued the albumin disappeared completely. The presence of albumin under this condition was probably due to muscular contraction of the neck of the bladder and damming up of urine in the ureter.

DR. A. A. ESHNER said that with reference to strangury following the use of methylene blue that this could be prevented by the simultaneous administration of powdered nutmeg. In the treatment of malarial fever methylene blue has been given in capsule in doses of a grain from three to five times daily in conjunction with powdered nutmeg, and this combination seems to have been successful in preventing the vesical tenesmus and disturbance in micturition that occurred when methylene-blue was administered alone.

DR. JUDSON DALAND read a paper entitled
**Observations to Prove that Tincture of
Digitalis is Inert in Tablet Form.**

(See page 708.)

DISCUSSION.

DR. H. A. HARE pointed out two radical errors that Dr. Daland had made in his experiments. In the first place he gave the tincture of digitalis to one patient and tablets of digitalis to another. In the second place, it would have been better to have taken some tincture of digitalis, had tablets made, given them to the man, then allowed

a sufficient period of time to elapse during which the effect of these administrations might pass away and then give that man some of the tincture from which tablets had been made.

There is another possible fallacy in the experiment, as digitalis is an exceedingly variable drug, inasmuch as its active principle cannot be isolated in the sense that a quantitative analysis can be made; different samples yield different quantities of so-called active principles, even if they could be isolated satisfactorily. Finally, these different active principles vary, and different samples of digitalis have very different physiologic action. Then, too, one or two active principles of digitalis are substances very easily affected by heat. One of the advantages in the employment of triturates and of tablets is supposed to depend upon the fact that the drug becomes minutely subdivided and therefore is more easily absorbed. In rubbing up with sugar of milk a certain amount of heat is generated and it may be that the digitalis thus undergoes some alteration. It is possible further that in compressing the tablets they are exposed to the heat of the compressing machine and for the purpose of increasing their cohesion.

DR. HENRY BEATES said that it has been clearly demonstrated that the tincture of digitalis is so invariable in physiologic activity, that whether it be administered in the form of tablet or tincture, its results cannot be relied upon, nor definitely determined. If a tincture is inert and it is made into a tablet, this latter is necessarily inert. On the other hand, a tincture representing a certain percentage of the various active ingredients of any drug, must in the form of a tablet constitute a medicament of similar complexity. A drug if assayed physiologically represents a definite factor in the treatment of disturbed functions, and tablets prepared therefrom would necessarily be the equivalent of a uniform preparation, and supply a sure basis upon which to formulate accurate therapeutics. The great defect of the tincture of digitalis belongs also to other tinctures, because crude drugs of vegetable origin contain several active principles in various percentages, and some of these are strangely antagonis-

tic one to the other. In digitalis the active principles digitalin, digitalin and digitonin are vaso-motor stimulants, while digitonin is a vaso-dilator, and if the leaves from which a given tincture is prepared, should happen to possess a certain percentage of the latter, it is entirely possible for the vaso-dilator action to neutralize the vaso-constrictor effect. These facts have much to do with the contradictory statements concerning the value of digitalis. The active principles of this drug also vary in their solubility in various menstrua, and thus the tincture and the infusion represent totally different percentages of active ingredients, as some are more soluble in water and some in alcohol. The great lesson to be learned is that all tinctures are by reason of the natural conditions obtaining, thoroughly unreliable as pharmacology supplies them, and unless they are assayed, and their true physiologic value determined, they should be eliminated entirely from the materia medica. After all, the only proper remedies are carefully isolated active principles, and these alone should have their value determined and be employed.

DR. HARE said that some years ago he had made certain analyses of various tinctures of nux vomica prepared according to the United States Pharmacopeia by a number of well-known druggists. It was found that not a single one of these tinctures, all made by reputable druggists, contained anything like the active principles, strychnin and brucin, expected of them. If variations of this kind can take place when reputable pharmacists prepare tinctures it is clear that errors may creep into any experiment, unless it be made with great caution.

DR. J. DALAND said that the object of his remarks was to elicit some discussion. The observation made, however, in the one case was interesting, because a man taking sixteen minims of digitalis four times a day over a period of ten or eleven days ought ordinarily to show some effects. It is probable that the percentage of cases immune to the influence of digitalis is not a large one. The experiments reported were not carried out to their full determination; and too much importance is not to be attached to the results.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated meeting November 9, 1897.

DR. J. H. JOHNSON reported two cases of **Congenital Hereditary Edema** occurring in male children respectively four and 1½ years, and exhibited the older patient. The father had suffered from a similar condition in childhood, which was later outgrown. In both cases there was marked subcutaneous edema of the lower extremi-

ties as shown by pitting on deep pressure with some thickening of the skin. In the older child the condition was most strongly marked. There were pads of edematous tissue over the feet, the legs were swollen nearly to the knees, and at birth there was present an edema of the foreskin. The child had been circumcised 2½ years ago, the prepuce being thickened and much elongated. The temperature of the limbs was

normal, the skin somewhat pale, but soon turning a natural color after exposure to the air, and the function of the limbs was unimpaired. Physical examination and study of the urine gave negative results. In the younger child the genitals were not affected. Both children were exceptionally strong, healthy and intelligent. These cases were evidently of extreme rarity. Milroy, of Omaha, had described a case very similar in character and had reported 21 other cases occurring in the same family during six generations. Van Harlingen and Griffith had also described a somewhat similar condition in a child under their care. The pathology of the condition was not known. Osler and Welch had been inclined to place Milroy's cases under the head of angio-neurotic edema. The cases shown to-night certainly did not suggest any resemblance to what we know of that disease. Neither did they resemble either scleroma neonatorum or edema neonatorum. There was evidently some anatomic condition as a causal agent. No special treatment had been instituted, but the mother had practised tight bandaging of the extremities in the older child, without effect. In both children, however, the swelling was somewhat less marked than at birth.

DR. VAN HARLINGEN.—I have not very much to say about this case because the number of such cases that come under a single observer's view is naturally very small. I cannot at present recall any case, excepting the one I saw with Dr. Griffith, which we tried in vain to get down here last winter. That case resembles this one very closely. As I recall it, however, Dr. Jopson has said about all I could say about that patient excepting in regard to the fact that the leg was nearly cylindrical and looked like a log of wood. The ankle was very much swollen, while the foot was less tumefied. The affection was unilateral and in addition to the testicle being enlarged there was also some edema on the face. When I saw the case for the first time I took an erroneous view of it, being inclined to think it a case of hereditary bone syphilis and it was not until Dr. Griffith demonstrated the edematous character of the swelling, which was firm and hard as a board, that I came over to that view.

In regard to the relation of such cases as the present one to angio-neurotic edema, they can not be brought under that head at all. I am rather surprised to find how much confusion there seems to be in the minds of many in regard to the disease known as angio-neurotic edema. That affection is much more closely allied to urticaria and local affections of the vaso-motor system of a similar nature than it is with any conditions similar to that we have seen here this evening. I think that the angio-neurotic edemas should be entirely separated from congenital troubles, such as the present case. I should be inclined to think that this was due to some congenital disease or

this was due to some congenital disease or should like very much if we could get an examination of one of these cases. I am strongly inclined to believe that we should find there is some congenital change in the distribution or structure of the lymphatics. I have not made any study of the literature of these affections, but I know there are a good many cases on record and I know there is a book by Dr. Busey, of Washington, which might possibly throw some light on cases like the present one. We are not likely, however, I fear, to know much more about the disease until we can get an opportunity for post-mortem study.

DR. H. R. WHARTON.—I saw this child when it was a few days old and at that time the deformity was very similar to the deformity he presents now. The only change I notice is that the swellings on the dorsal surface of the feet are softer and pit more readily on pressure. At that time the feet were as firm and tense as the legs are now. The prepuce also presented very much the same condition. The firmness was so great that I did not look upon it as an edema, but thought it was a connective tissue hypertrophy; later I thought it might have some connection with lymphatic disturbance.

DR. ALFRED STENGEL.—I am very glad to hear Dr. Van Harlingen express this opinion because in reading a previous report of a case of this kind, although I had never seen one, it occurred to me that there might be a connection between this condition and the congenital elephantoid disease or lymphangiectasia described by the pathologists. An instance of the latter condition was presented before the Obstetrical Society by Dr. Reynolds Wilson a few years ago. The condition is not very rare, but the fetuses rarely live; they are monsters of the most pronounced type. The pathology is pretty well made out, and consists essentially in an enormous dilatation of the lymphatic spaces and channels. There is undoubtedly some occlusion of the latter and retention of the lymph with infiltration of the tissues. A great hyperplasia of the connective tissue surrounding the dilated lymph spaces results. In external appearances the congenital elephantoid condition can hardly be likened to that before us, for in the former there are distinct cysts and a boggy softness, due to cystic distension. But essentially I conceive that the two conditions are very much the same. The difference being only the degree of distension of the lymphatic spaces. In the case of the kind presented I can hardly see any other explanation than the one suggested. There are none of the characteristics of cardiac or renal edema and it is certainly not in any sense allied to what we recognize as angio-neurotic edema.

DR. REYNOLDS WILSON.—I have had two occasions of reporting lesions of the subcutaneous tissues and lymph spaces. The first

was the case referred to by Dr. Stengel. In that case there was an excessive dilatation of the superficial subcutaneous lymphatics to such an extent that the child presented a cystic condition, an absolute deformity which amounted to a monstrous condition. In the other case a new born infant presented great thickening of the skin without the hardness which would be met with in scleroderma and without the evident edematous condition which is shown locally in this case. The child died and on making sections I found in the first place hyperplasia of fat tissue, of connective tissue, considerable dilatation of spaces and a very unusual, hitherto undescribed hyperplasia or hypertrophy of the subcutaneous muscular system. The hyperplasia of these muscles was so great that they presented strands running across the whole of the tissue and marking off the lymph spaces between them. I had occasion to go into the subject pretty carefully and there is no doubt about it that these conditions are embryonic in nature. The neurotic element is not of much importance in the study of the subject. The embryonal conditions such as these are associated in the first place with a hyperplasia of the connective tissue, with great dilatation of the lymph-space and also often of a hyperplasia of the fatty tissue. In looking up the subject from an embryologic point of view it was made clear that the fatty tissue and the connective tissue had as a basis one form of embryonic cell tissue and where you had a hyperplasia of one you very often had a hyperplasia of the other, so that edema occurring as in this case is possibly associated with a myxedematous condition and possibly with an increase of fatty tissue. It is possible that it is not a simple edema, but that being an embryonal affection it is associated with these other hyperplasias.

DR. A. A. ESHNER.—I do not know that it will add very much light to the discussion to raise the question whether cases of this sort belong to the large group comprehended in the dystrophies. There are some features in the case which suggest pseudo-muscular hypertrophy, but this boy appears to possess considerable muscular vigor and the knee jerks are preserved. Cases of this kind, however, exhibit all degrees of severity. In some there is great loss of muscular structure, with substitution of fatty tissue, which takes place, and in others the conditions are quite the reverse. A therapeutic suggestion presents itself and that is in connection with the use of thyroid extract in a case of this sort.

DR. C. J. HOBAN.—Dr. Wilson's remarks bring to mind four cases. The first was one of the lower part of the fetus; it had undergone myxedematous degeneration and upper part sclerosed. It was a very large child. The other three cases occurred in one family; all had undergone myxedematous degeneration. The placenta in the three

cases had also undergone myxedematous degeneration and were about three times the normal size.

DR. JOPSON.—Dr. Wharton's remark that when he saw the child the edema was harder than it is now, might be explained by the fact that in children edema is often of the variety known as edema lymphae, from the smallness of the inter-fibrillary spaces, and granting this is a simple edema we would expect it to become softer in character as the child grew older. I am glad the members agree with me that this condition is not purely nervous in origin, but that it must have some anatomic foundation. In two of Milroy's cases it was not congenital, but followed an injury. In each case the accident happened to the limb which afterward became enlarged, so that presuming the edema is dependent upon some embryonic peculiarity of the tissues it might be that the injury was all that was necessary to call it forth. As to its being of lymphatic origin that is a point which we cannot at present decide. I do not think it can be purely myxomatous. With the pitting on pressure and the increase in size on standing and walking, there must be an increase in the amount of serous fluid in the limb. As to the suggestion that thyroid might be of value, it would certainly be worth a trial in these cases. I do not think we have to do with any such condition as cretinism, as intellection is good, and the health in every other respect is above par. Milroy advanced the theory that the edema might be due to a congenital absence of the valves of the veins in the lower extremities. In the absence of proof this can only go down as a suggestion.

DR. F. A. PACKARD read a paper upon
The Treatment of Intussusception from a Medical Stand-point.

Intussusception (aside from the agonal form) is an extremely rare affection. A case reported from the Children's Hospital, of Philadelphia. It concerned a female infant, aged eight months, seen on the fifth day of the disease. Owing to the fact that the illness had existed for a time sufficiently long for adhesions to have formed and for ulceration or sloughing to have taken place no mechanical, non-surgical treatment was adopted, but the case was transferred to the surgeon. Laparotomy was performed, the invagination reduced and two perforating ulcers sutured. The child died three hours later.

The dangers of using injections after the third day of the disease and of employing too high a pressure at any time were dwelt upon, examples being quoted from literature. It was recommended that injections should not be used after the third day except as the preliminary step of a possible immediate laparotomy and that the reservoir of the injection apparatus be held at a height of three feet at the outset, to be

in which
are per
esque's
ing in
acute,
seventh
weeks o
logy an
Martin
impress
tussusc
commo
he has
has eve
pital of
ords o
pancity

Eight

with s

Dr. M.

majority

of the

surger

had ne

ing th

monst

rather

There

success

render

piled

person

to ha

could

the st

childr

month

parat

year,

of oc

ileo-c

vagin

the i

lower

color

flexu

acter

the

The

of i

is p

will

Th

tren

gene

case

mor

of l

ing

the

T

erec

gradually elevated to eight feet, but never to exceed the latter point.

DR. EDWARD MARTIN read a paper on

The Surgical Treatment of Intussusception.

in which he stated cases of intussusception are perhaps best classified under Raffinetsque's system as ultra-acute, death taking in the first twenty-four hours; acute, terminating between the first and seventh day; and, sub-acute, lasting two weeks or upward. After discussing the etiology and pathology of intussusception, Dr. Martin stated that he has been particularly impressed with the extreme rarity of intussusception. It is usually regarded as a common affection of childhood. So far as he has been able to discover but one case has ever been treated at the Children's Hospital of Philadelphia. Examinations of records of other institutions reveal a similar paucity of material.

Eight hundred personal letters sent out with stamped envelopes to return brought Dr. Martin only 54 cases. The great majority of these letters were answered. Men of the widest experience both in medicine, surgery and in pediatrics stated that they had never seen a case. His purpose in sending these letters was not primarily to demonstrate the rarity of intussusception, but rather to demonstrate its true mortality. There is a natural tendency to report only successful cases, and believing that this rendered entirely inaccurate statistics compiled from general records, he started a personal investigation confidently expecting to have several hundred cases from which could be drawn reliable conclusions. All the statistics showed that intussusception in children is most frequent about the sixth month, that after fifth year it becomes comparatively rare until the fortieth or fiftieth year, when it again increases in frequency of occurrence. In the first year of life the ileo-cecal form is more common than the combined form of all the others the ileal invagination being exceedingly rare. When the ileum is involved it is usually in its lower segment. Intussusception of the colon is commonly found in the sigmoid flexure. The acute form in infants is characterized by a painful onset, commonly in the ileo-cecal or umbilical region.

There can be no question that many cases of intussusception are not recognized. It is probable that examination under ether will show a tumor in practically all cases.

The prognosis of intussusception is extremely grave. Leichtenstern places the general mortality as 73 per cent. In 73 cases collected by Hare and Martin in 1889 the mortality was 90 per cent. In the first year of life the mortality is much higher, reaching 80 per cent., death commonly between the fourth and seventh days.

The methods of treatment to be considered are massage, rectal injections and re-

duction of invagination through an abdominal opening. Though massage has successful cases credited to it, it is at best a blind and usually futile measure and one likely to do more harm than good. Injections are of incontestable value and in so far as statistical study goes have been nearly as successful as has abdominal section. Injections of liquid aside from direct surgical interference afford the most efficient means of reducing invagination. The liquid of choice should be normal salt solution at a temperature of 102 F. As a result of experimentation Hare and Martin found that by a pressure of 1½ pounds warm normal saline solution could be passed from the rectum into the stomach of a dog without interfering with its final functions in the slightest degree without being followed by any impairment in digestion or general health. A cold solution produced marked and immediate shock, was much slower in going through and left the dog sick for some hours. The hot injections at 116 F. caused death from heat-stroke.

As to the method of giving forced injection this should be so directed that the pressure of the fluid should be gradual, steady and progressive. The child should be wrapped in cotton, should be thoroughly relaxed with ether and by means of a fountain syringe normal saline solution at a temperature of 105 should be allowed to flow into the rectum at the rate of about four ounces to a minute, under a pressure at first not over two pounds to the inch, obtained by elevating the irrigating bag four feet above the level of the anus. The liquid is prevented from regurgitating by a shoulder made upon the injection pipe by wrapping it with a narrow bandage. This treatment should be continued for not less than fifteen nor more than thirty minutes, the bag being gradually raised to a height not greater than 8 feet and the abdomen being kneaded during the treatment. For an infant not more than three pints of fluid should be employed and before making this attempt at disinvagination all preparations for abdominal section should be made. When injection fails immediate celiotomy is indicated. The median incision is best. There has never been any trouble in finding intussusception; the first effort should be directed toward accomplishing disinvagination. This is best attained by stripping back the intussusciptions. In case of failure the modified Maunsell method is the one of choice. This consists in making a longitudinal incision in the intussusceptum, delivering through this the entering and returning folds of the intussusciptions, removing the greater part of the tumor thus formed and restoring the continuity of the intestine by suture. A further modification of this method and one which would lessen the danger of sewing the peritoneum and make only a short cut necessary in the intussusciptions, consists in seizing the neck of the tumor in a clamp or ecraseur, cutting it away below, drawing

the stump through the opening of the intussusciens and uniting the gut as in the Monsell method. The separated and usually sloughing mass should be pushed along the bowel until reaches the rectum, from which it could be delivered by forceps.

The case operated on by Dr. Martin was referred by Dr. Charles Hoban. The child was seven months old and exhibited all the typical symptoms. Eight hours from the onset of attack, one thorough trial at disinvagination by injection was made. This was followed by free fecal evacuation, but an abdominal tumor was still felt. Abdominal section was performed immediately. The invagination was of the ileo-cecal variety, four inches of the ileum and all of the ascending and transverse colon forming the intussusciens. It was reduced by a milking motion practised with both hands. Six days later the stitches were removed, the wound had completely healed and the belly was strapped. A violent attack of vomiting incident to a too free meal tore open the wound eight hours later, allowing of extrusion of the greater part of the intestines. A double line of sutures was applied and no further difficulty was experienced.

Of the fifty-two cases collected from pri-

vate sources by Dr. Martin the average age was 30 months. Vomiting was present in 89 per cent., bloody, mucous evacuations in 87 per cent., severe pain in 85 per cent., tumor in 79 per cent., and tenesmus in 77 per cent. Two cases were subject to medical treatment alone, both resulting fatally, two cases had no treatment and both died; 43 were subject to injections, of these 15 were subsequently operated on. Of the 28 cases not operated on but treated only by injection 16 recovered; of the 15 cases operated on 3 recovered. These figures show how high is the mortality of operative treatment.

DR. R. G. LECONTE read a paper on Intussusception of the Post-mortem Type Observed During Laparotomy.

While performing laparotomy for a penetrating stab wound of the abdomen in a boy aged nine three intussusceptions of the small intestine were met with. Two were direct and the other retrograde, all having the characteristics of the post-mortem type of intussusception and none of the characteristics of the obstructive invaginations occurring during life. The recovery of the patient was uneventful.

PERISCOPE.

Some very sensible remarks have been made by the President of the New York Society for the Prevention of Cruelty to Animals. In a recent address he called attention to the fact that nearly all stray animals are diseased, and therefore a constant danger to healthy animals. But this is not the only danger, for he adds: "Human diseases are undoubtedly propagated in the same way. In cases of diphtheria, small-pox, scarlet fever, measles and diseases of the skin in general, no disinfection of houses or rooms can be effectual if dogs and cats which inhabit them are not likewise disinfected; and in the opinion of many competent physicians the spread of contagious diseases must be in many instances attributed to this cause."—*Health*.

Nucleins are proteid bodies, the distinguishing characteristics of which are their comparatively large amount of phosphorus and their insolubility in strong alcohol and dilute acids. These facts, however, the *Medical Age* says, have not prevented the employment by the medical profession of alcoholic preparations said to contain nuclein and which must necessarily be inert. The physicians of to-day rely altogether too much upon the representations of interested manufacturers, instead of studying available scientific literature.—*Western Drug*.

The simplification of nomenclature would lessen the temptation the student has to attach himself to a treble-barrelled verbal curiosity rather than to gain an insight into the thing itself, and this alone would make for good. But seriously, the time spent in learning the meaning of medical terms is labor which ought to be reduced to a minimum. Each science has its own phraseology—a phraseology which its votaries must acquire and understand; but this, ought at least to be made as easy and simple as possible. Consequently, although the dreams of the spelling reformer are usually Utopian, we cannot but sympathize with the efforts of those who draw periodical attention to the muddles in the spelling of the medical vocabulary.—*The Lancet*.

A correspondent of one of our medical exchanges says that there is generally dissatisfaction expressed over the appointment of State chemist and assistants. The only qualification one appointee in his State had was that he had "roomed next to a chemistry student for six months, and had allowed the odors of chemicals to invade his room." The question is whether some appointees can show up so much experience even.—*Western Drug*.

Practitioners with a large experience in obstetrics, and organizations which are in the habit of making collective investigations of births, have noted the fact that in proportion as the number of births under investigation increase, so much the more does the frequency of plural births approach a uniform ratio. In Massachusetts, for a period of forty years (1856 to 1895), this ratio is found to be a little less than one per cent. for twins, or more accurately, .92 of one per cent., and a little more than .01 of one per cent. for triplets, or more accurately, .013 of one per cent. Stating the question otherwise, there were 109 living births to each case of twins in the whole period, and 9,626 births to each case of triplets. In proof of the remarkable uniformity in the occurrence of triplets in long periods of time, it was found that there were 9,623 living births to each case of triplets in the first twenty years (1856-1875); and 9,629 living births to each case of triplets in the second twenty years (1876-1895). These figures are the result of observation upon over 1,750,000 births which occurred in Massachusetts in the forty years (1856-1895).

In proof of the uniformity of occurrence of these events when still larger numbers are considered, and for other countries, the following figures are presented :

RATIO OF PLURAL BIRTHS TO EACH
1,000 BIRTHS.

	Twins.	Triplets.
Switzerland...	12.2	0.12
Prussia	12.2	0.13
Bavaria	12.4	0.15
Austria	11.7	0.15
Italy	12.1	0.15
France	9.8	0.11
Sweden	14.4	0.17
Massachusetts ..	9.2	0.13

The foregoing table presents the results of observations upon twenty million births in the countries named. In this connection it is interesting to note the following case: The wife of a poor tailor living in a rear tenement house down-town on the east side, on December 7th, gave birth to triplets, three healthy boys, whose combined weight was nineteen pounds. Two days afterward she is reported to have been delivered of two other children, both of which were still-born. The mother, who is twenty-eight years of age and had previously had two children (one of which is three years old, and the other one year) is said to have passed through the trying ordeal in excellent shape and to be now on the high road to recovery.—*Boston Med. and Surg. Jour.*

Ophthalmologists now recognize the bicycle eye, a specific disease brought on by the dust and dirt introduced into that organ by riding on the road.

In eighteen labours in which women apparently in a dying condition were delivered per vias naturales, six children, including one of a pair of twins, lived, and five were born dead; the remaining expired soon after delivery. Turning after various methods was exclusively the means employed in all of the cases. In six the mothers were suffering from eclampsia: of these five recovered, including a twin labour case. Three had cerebral apoplexy; of these two recovered. Two with advanced phthisis survived for a few weeks. Four were flooding from placenta previa; of these three were saved. One with pulmonary congestion recovered. One bleeding from an internal wound was saved; and one, injured by a fall, died. I have collected nineteen cases of Cesarian section performed upon dying women; all were graver cases than those in the table, and all died. In thirteen cases the child was alive; one labor was of twins, making fourteen children saved. In only two was the os more or less open.—*Univ. Med. Mag.*

Stadelmann (Berl. Klin. Woch.) had the opportunity to observe three cases of chronic poisoning by carbon disulfid, taking place in a vulcanite factory. In addition to the symptoms of extreme digestive disorders, there were tremor, giddiness, ringing in the ears with poor hearing, inability to sleep, muscular weakness, trembling, more or less marked ataxia, strong increase of mechanical muscular irritability, disturbance of sight and sensibility, Romberg's symptom, incontinence of urine and sexual impotence.—*Western Drug.*

Professor Bilslik claims that water may be sterilized in five minutes by adding to it bromin, and that bromin may be then neutralized by adding ammonia, says *Popular Science News*. The river-water of Berlin has been tested 200 times. After being treated with bromin and ammonia all germs of disease were destroyed, including those of cholera and typhoid. A gallon of water, it is said, may be sterilized as follows: First add to it three drops of the following solution: water 100 parts, bromin 20 parts, potassium bromide 20 parts, and then after five minutes add three drops of a nine per cent. solution of ammonia. This process is recommended as a rapid, cheap and effective way to sterilize drinking water for armies, on board of ship, in unhealthy localities, and for medical and surgical purposes.

In order to clean hypodermatic syringe needles, occluded by deposition of material from the injection fluid, boil the needles for ten minutes in a solution of sodium carbonate. This not only cleanses the needle internally but also restores the brightness of the external surface.—*BROWN.*

NEWS AND MISCELLANY.

Dosimetry is a medico-therapeutic method based upon physiology and clinical experience. It has for its principal application the employment of the alkaloids in divided doses, exactly measured, in the form of granules (Dosimetric Granules of Ch. Chanteaud.) This mode of employment permits of the administration of the alkaloids in doses relatively considerable in an absolutely safe and convenient form.

In instituting dosimetric medication at the onset of an acute disease, the physician, can, in most cases, restore the normal temperature; the fever is dissipated; organic localizations do not occur; the disease is jugulated. In the case of eruptive, infectious, cyclic diseases, the evolution of the disease proceeds generally in regular order; the eruption is properly developed; complications are avoided. In chronic maladies, the functions of the system are, as far as possible, regulated, the vital forces of the invalid sustained and the strength conserved.

Among the alkaloids, strychnin, $\frac{1}{10}$ gr. ($\frac{1}{2}$ milligram), amorphous aconitin, $\frac{1}{10}$ gr. ($\frac{1}{2}$ milligram) and amorphous digitalin, $\frac{1}{4}$ gr. (1 milligram) are those whose action are the most sure. These three alkaloids (Dosimetric Triad or Trinity) constitute the usual defervescent, and their administration is called for in all acute diseases, whenever the temperature exceeds 100.5° (38° C.). They should be given every hour, every half hour, and every quarter of an hour, according to the severity of the disease. They should be continued until their effect (profuse sweats) is produced, boldly without fear. The trial has been made a thousand times, upon man and upon animals, without ever producing untoward results.

By analogy, and by extension, dosimetric physicians employ, always in divided doses according to the intensity of the disease and to the condition of the invalid, all the other alkaloids, and also all the active medicines. The dosimetric method, thus generalized enables the physician to obtain without danger, beneficial effects of great power.

It is to the interest of all physicians to verify these affirmations.—*Dosimetric Med. Rev.*

Expressed in time units, the distance between Cape May, N. J. and Philadelphia, is 100 Minutes—measured by the "Century Flyer" over the route of the South Jersey Railroad.

This, and like marked reductions in time to other points, in connection with the superior modern equipment, splendid service, and capable management maintained by the railroad, easily accounts for recent great increase of travel to the health resorts along the southern coast of New Jersey.

While pediatrics cannot be looked upon as a specialty, it requires special study and work to acquire proper expertness in diagnosis and treatment. Some diseases are practically confined to early life, while others assume a peculiar type at this time. Thus, such affections as typhoid fever and rheumatism often differ so widely in their manifestation as to be hardly recognizable as the same disease in adults. The physical and rational signs of disease also widely differ from adult life. The colleges do not recognize the importance of a thorough teaching of pediatrics. The average young man on graduation goes out to cope with what will prove the most important and vital share of his practice, with the same amount of instruction that has been bestowed upon disease of the eye and ear, or nose and throat. There is especially no excuse for this neglect of sufficient instruction in children now that three and four years are consuming in the college course.—*Post-Grad.*

Dr. B. Treutler (*Klin. Mon. f. Augenhelkunde*) has investigated the action of Eupthalmin, the new mydriatic in the Marburg University Eye Clinic, under the direction of Professor C. Hess. The new preparation is the hydrochloric acid salt of a mandelic derivative of n-methyl-vinyl-diaceton-alkamine. It is closely related to the new anesthetic eucain, bearing the same relation to it chemically as does homatropin to tropa-cocain.

Careful comparative experiments with the new mydriatic have led Treutler to the following conclusions:

1. The instillation of eupthalmin solutions into the eye causes only very slight and temporary inconvenience.
 2. Eupthalmin is a powerful mydriatic. A 5 to 10 per cent. solution produces the maximum extension of the pupil in about the same time as 1 per cent. homatropine solution.
 3. The mydriatic action is less intense and prompt with adults than with young people.
 4. As a mydriatic eupthalmin has the advantage over cocain, that it is more powerful in action, and does not damage the corneal epithelium; on the other hand, mydriasis is somewhat slower in development.
 5. Eupthalmin affects the accommodation less than does homatropin.
 6. The disappearance both of mydriasis and of the paresis of the accommodation takes place much more quickly than after employment of homatropin.
 7. No unpleasant effects upon the organism have hitherto been observed.
- The new preparation has, therefore, several important advantages over other mydriatics of brief activity, so that it invites extended employment in ophthalmological practice.